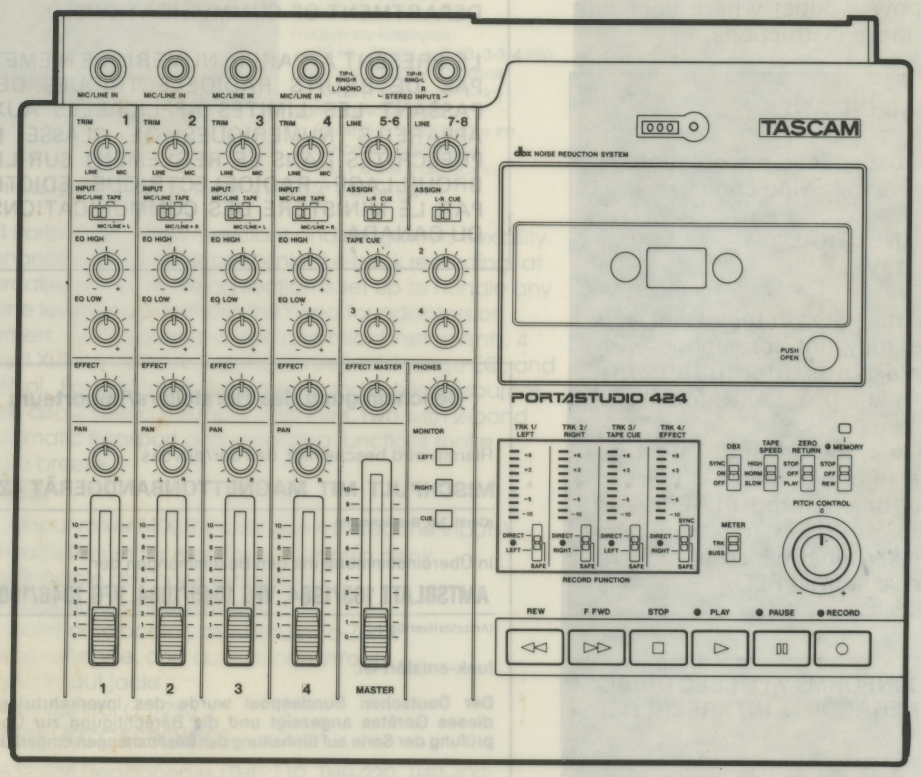
TASCAM

TEAC Professional Division

424

PORTASTUDIO



OWNER'S MANUAL

5700124700

Important Safety Precautions

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

NOTE FOR U.K. CUSTOMERS

U.K. Customers Only:

Due to the variety of plugs being used in the U.K., this unit is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals of your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

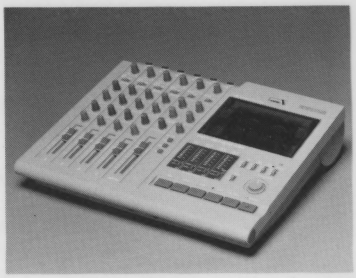
THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989
DIRETTIVA CEE/87/308

424
PORTASTUDIO

SPECIFICATIONS

Format: 4 Track, 8 Input Channels
Mixer Inputs: 4 Mono, 2 Stereo
Tape Speed:
15/16, 1-7/8 & 3-3/4 IPS
Tape: Hi Bias Cassette
Frequency Response:
40 Hz 16 kHz (± 3 dB, 3-3/4 IPS)
Adjacent Channel Crosstalk:
70 dB (1 kHz, 0 VU, NR in)
Signal to Noise Ratio:
95 dB (IHF "A" WTD, dbx in)
Total Harmonic Distortion:
1% (1 kHz @ 0 dB, dbx in)



WEIGHT: 5-1/2 LBS DIMENSIONS: W: 14-3/8" X H: 3-7/8" X D: 11-5/8"

The 424 is designed to meet the needs of musicians and songwriters, with more of the useful features that have made the Portastudios the industry standard. The mixer controls are conveniently laid out in an easy-to-use, familiar way for traditional recording. When you want to expand into electronic music, the 424 can mix up to 8 MIDI sources or effect returns in addition to the tape tracks, thanks to two additional stereo channels and the Input Bypass feature. Four channel record and three-speed capability add even more flexibility

FEATURES:

- 8 input mixer (4 mic/line inputs plus 2 stereo line inputs)
- Switchable dbx noise reduction
- 4 track simultaneous record via Direct Mode
- Input Bypass and Cue Assign accomodate virtual tracks
- Sync in/out jacks
- Pitch control (± 12%)
- Headphone jack

OPTIONAL ACCESSORIES:

- TASCAM Headphones (THP-110, THP-220, THP-400)

5

Safety Instructions

CAUTION:

- **Read all of these instructions.**
- **Save these instructions for later use.**
- **Follow all warnings and instructions marked on the audio equipment.**

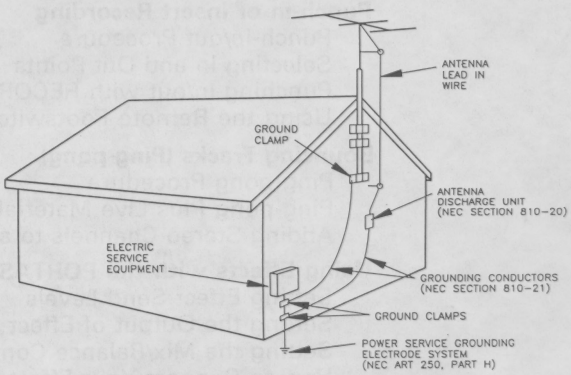
1. **Read Instructions** – All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Water and Moisture** – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. **Carts and Stands** – The appliance should be used only with a cart or stand that is recommended by the manufacturer

6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

7 **Wall or Ceiling Mounting** – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer

8. **Ventilation** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning** – The appliance should be cleaned only as recommended by the manufacturer
14. **Power Lines** – An outdoor antenna should be located away from power lines.
15. **Outdoor Antenna Grounding** – If an outside antenna is connected to the receiver be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70 – 1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure below.

EXAMPLE OF ANTENNA GROUNDING
AS PER NATIONAL
ELECTRICAL CODE


ANTENNA LEAD IN WIRE
GROUND CLAMP
ANTENNA DISCHARGE UNIT (NEC SECTION 810-20)
ELECTRIC SERVICE EQUIPMENT
GROUNDING CONDUCTORS (NEC SECTION 810-21)
GROUND CLAMPS
POWER SERVICE GROUNDING ELECTRODE SYSTEM (NEC ART 250, PART H)

NEC NATIONAL ELECTRICAL CODE

16. **Nonuse Periods** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
17. **Object and Liquid Entry** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
18. **Damage Requiring Service** – The appliance should be serviced by qualified service personnel when
    A. The power-supply cord or the plug has been damaged, or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
19. **Servicing** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

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The PORTASTUDIO 424 is...

FEB 1, '92

The PORTASTUDIO 424 is an 4-track "Multitrack Master" cassette tape recorder and a full-function 8x2 mixer combined into a single workstation

Its high audio quality and creative flexibility reflect the experience and innovation that have allowed TASCAM to earn its reputation in professional audio production fields, and its user-friendly design makes the 424 suitable for anyone, from expert to novice.

Using this manual : To get the most out of your 424, please take the time to read through this manual Some time spent now will keep you from overlooking some of the features that make the 424 a more creative tool. You may discover some new tricks you haven't tried before.

Use of capital letters In general, we use all upper case type to designate a particular switch, control, jack name or label (like PAN). Transport modes and some features are described with an upper case first letter (like Record mode).

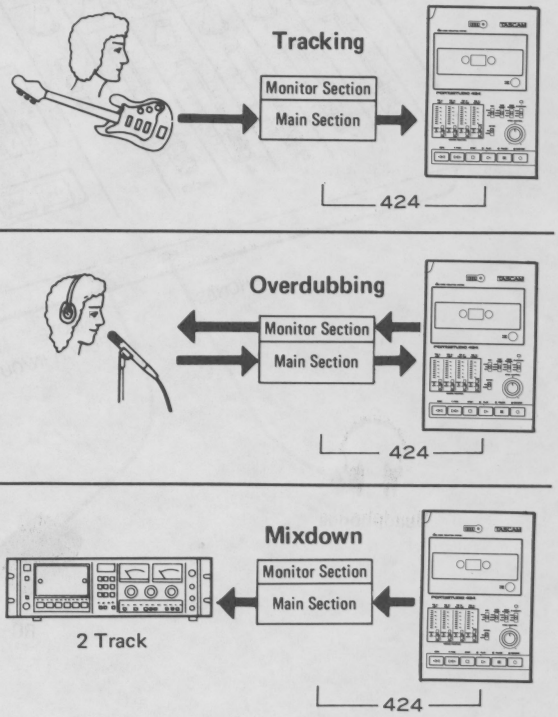
The Recording System

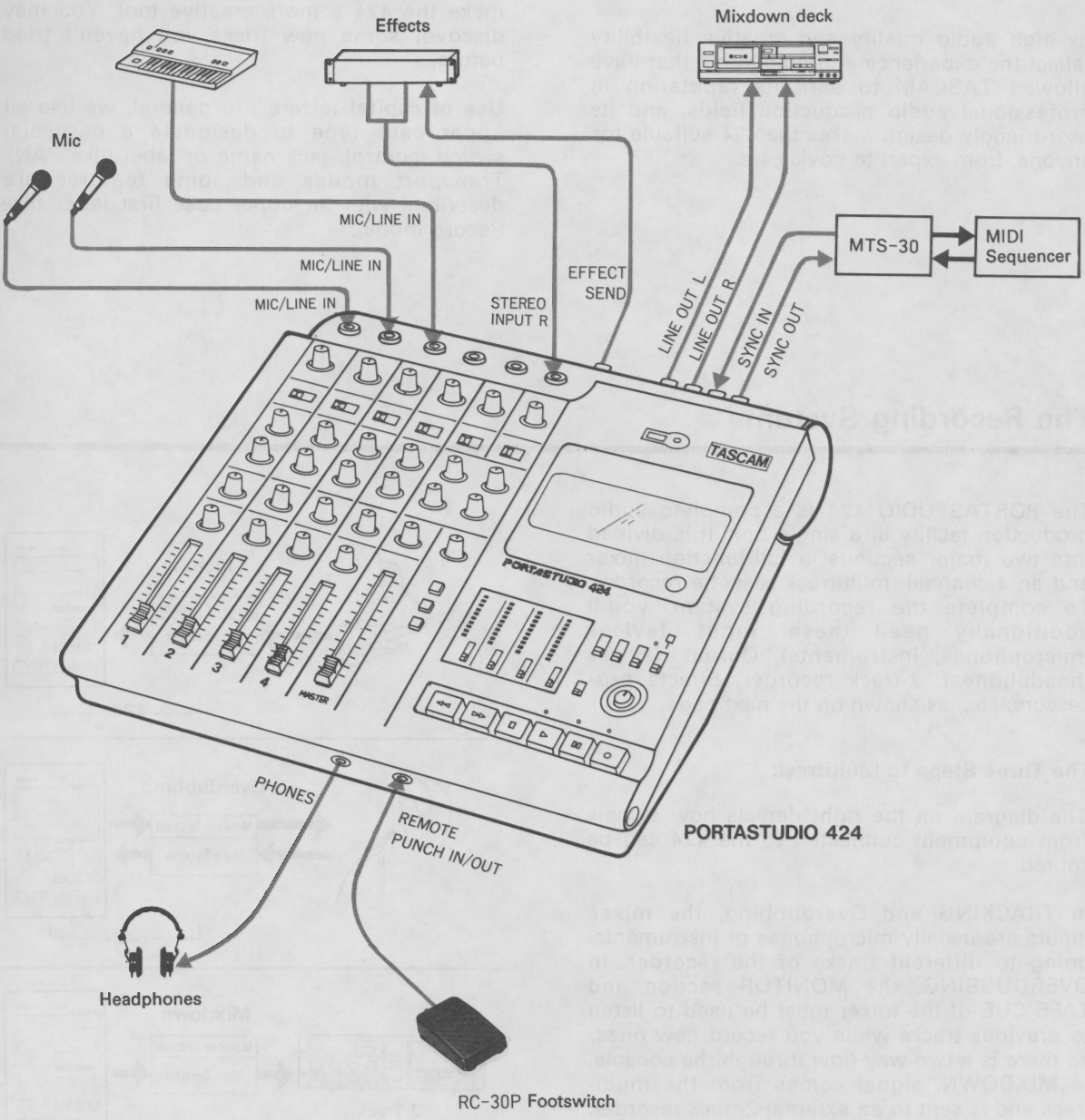
The PORTASTUDIO 424 is a complete audio production facility in a single box. It is divided into two major sections: a full-function mixer and an 4-channel, multitrack cassette recorder To complete the recording system, you'll additionally need these Input devices (microphones, instruments), Output devices (headphones), 2-track recorder, Effects processors, etc., as shown on the next page.

The Three Steps to Multitrack

The diagram on the right depicts how signals from equipment connected to the 424 can be routed.

In TRACKING and Overdubbing, the mixer inputs are usually microphones or instruments, going to different tracks of the recorder In OVERDUBBING, the MONITOR section and TAPE CUE of the mixer must be used to listen to previous tracks while you record new ones, so there is a two-way flow through the console. In MIXDOWN, signal comes from the multitrack and is sent to an external 2-track recorder

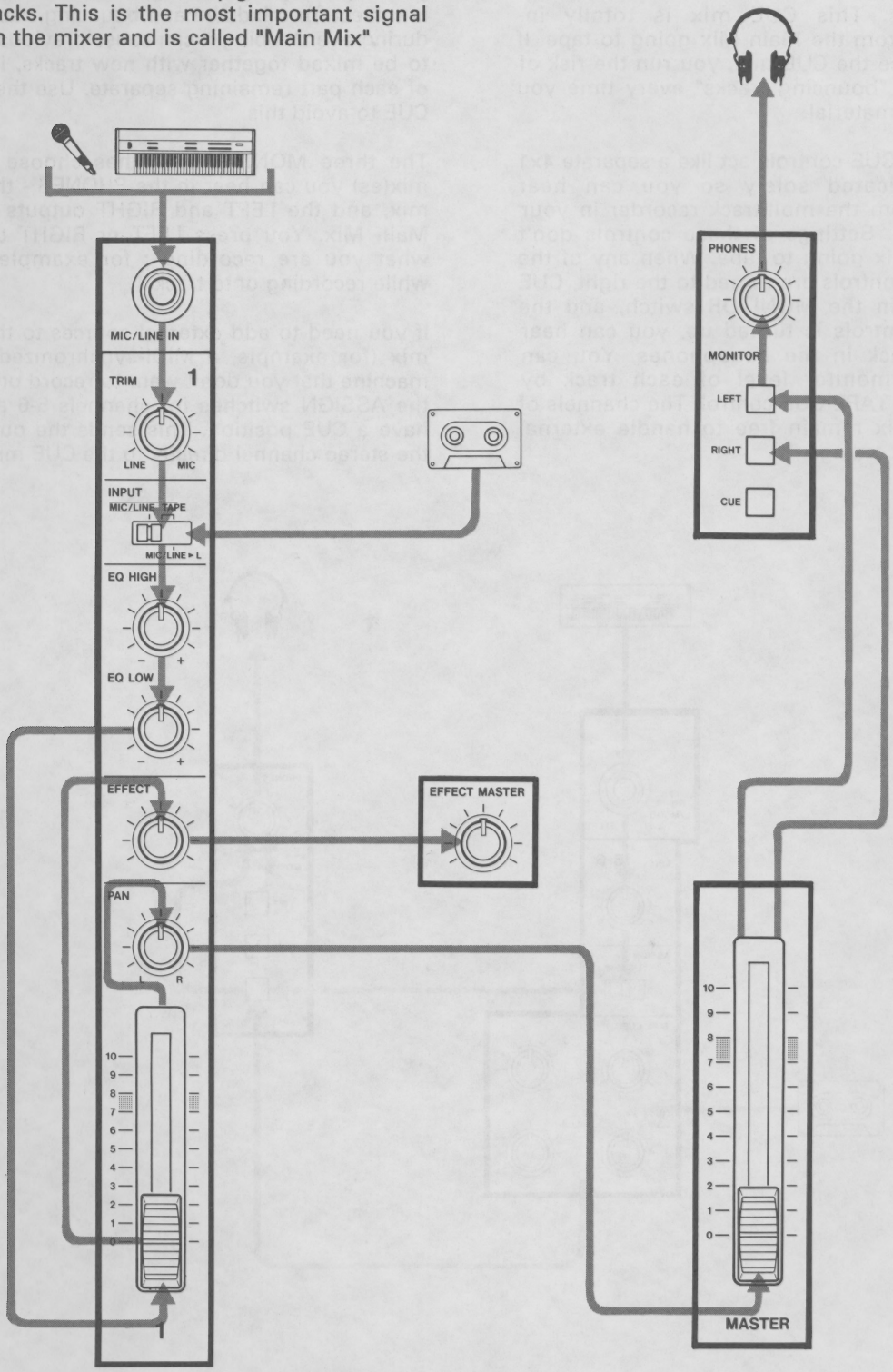




PORTASTUDIO 424

Signal Flow in the 424 Mixer

The illustration below shows how the input signal passes through the 424 Mixer section. After the MASTER fader they go to the L/R LINE OUT jacks. This is the most important signal route in the mixer and is called "Main Mix"



Tape Cue Monitor System

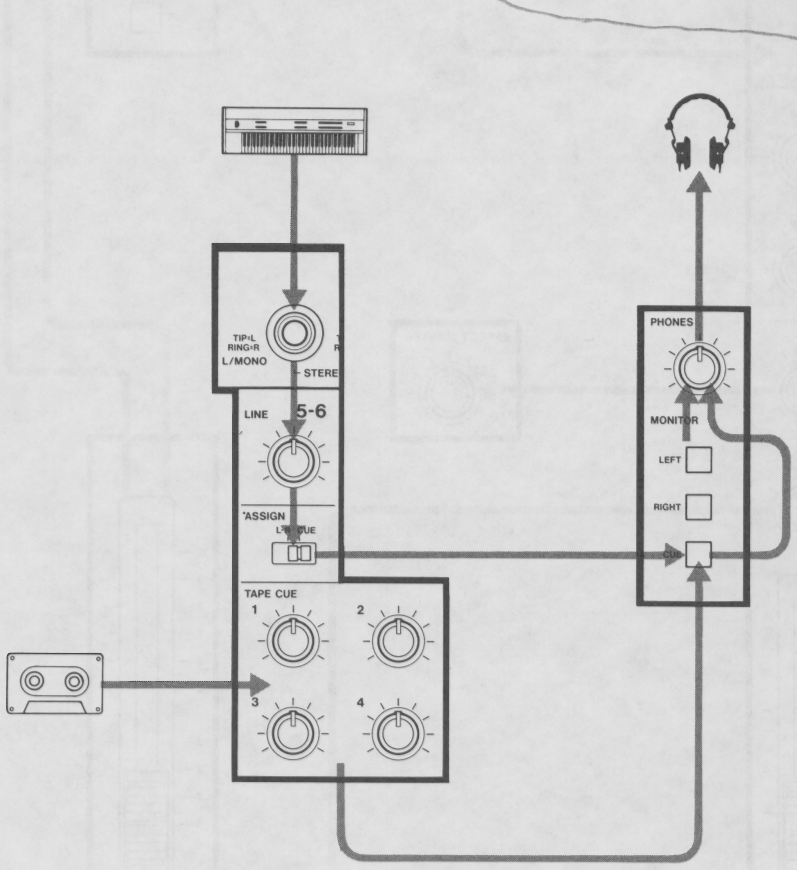
The TAPE CUE mix and MONITOR switches are also crucial for successful multitrack recording, because they control what you hear in the headphones. This CUE mix is totally independent from the Main Mix going to tape. If you don't use the CUE mix, you run the risk of accidentally "bouncing tracks" every time you record new material.

The 4 TAPE CUE controls act like a separate 4x1 mixer, dedicated solely so you can hear playback from the multitrack recorder in your headphones. Settings of these controls don't affect the mix going to tape. When any of the TAPE CUE controls are turned to the right, CUE is pressed in the MONITOR switch, and the PHONES controls is turned up, you can hear tape playback in the headphones. You can adjust the monitor level of each track by adjusting its TAPE CUE control. The channels of the Main Mix remain free to handle external inputs for recording.

If you can hear tape playback in your headphones when CUE is not pressed, it means you're hearing tape through the Main Mix. This is correct for mixdown and bouncing tracks, but during overdubbing it can cause previous tracks to be mixed together with new tracks, instead of each part remaining separate. Use the TAPE CUE to avoid this.

The three MONITOR switches choose which mix(es) you can hear in the PHONES - the CUE mix, and the LEFT and RIGHT outputs of the Main Mix. You press LEFT or RIGHT to hear what you are recording for example, LEFT while recording onto track 1

If you need to add external sources to the CUE mix (for example, a MIDI-synchronized drum machine that you don't want to record on tape), the ASSIGN switches for channels 5-6 and 7-8 have a CUE position. This sends the output of the stereo channel directly to the CUE mix.



Multitrack Cassette Recorder

The 424 records on readily available standard (Philips) Compact Cassette tape, high bias Type II. The recorder has 4 tracks while the mixer has a stereo output; however, using the DIRECT feature you can record on any or all of the 4 tracks at one time. For more details, see "How to Record More than Two Tracks Simultaneously", page 18.

The 424's dbx Noise Reduction virtually eliminates unwanted tape noise. A special SYNC feature turns off the dbx on track 4 separately, making it possible to record and play back the MIDI sync tones or SMPTE/EBU time code without being affected by the dbx encode/decode. This ensures that the sync tones/code are recorded and played back without unnecessary processing. With proper operating techniques, it is not necessary to leave a guard band between music and sync tone tracks because of the low crosstalk of the TASCAM heads.

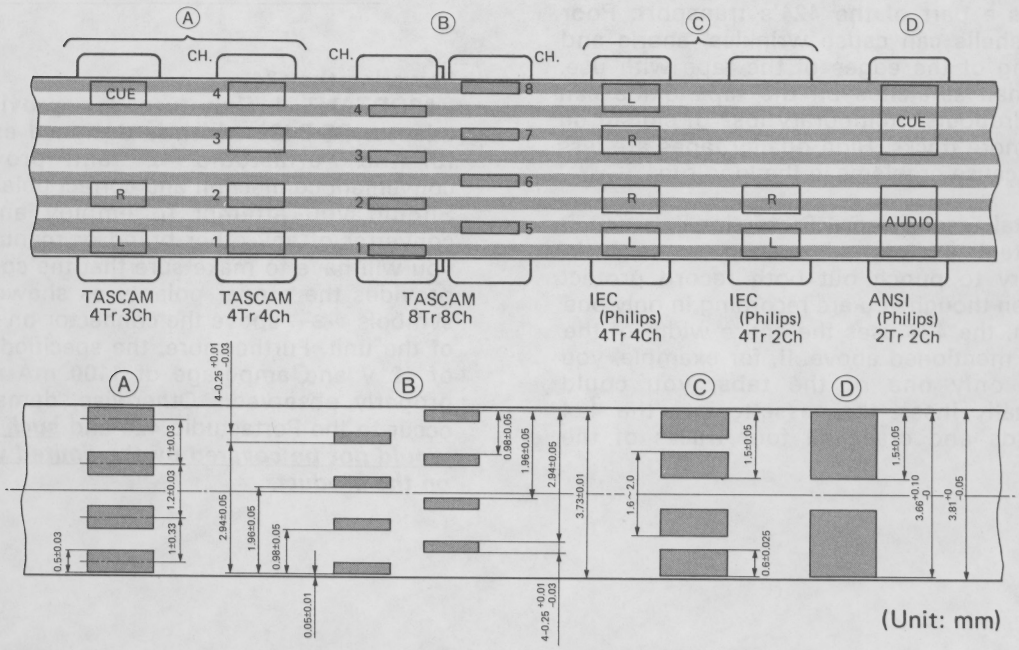
The transport controls of the 424 are microprocessor operated, allowing highly reliable functions that make the unit easier to use:

- Three tape speeds offer HIGH for greater fidelity, NORM for compatibility with standard cassette tapes, and SLOW for studying complex musical passages.
- ZERO RETURN will automatically STOP or PLAY the transport when it is fast wound to the 000 counter position.
- MEMORY will automatically STOP or REWIND the transport when it reaches a counter position that you select. In combination with ZERO RETURN PLAY, you can use MEMORY REWIND to automatically repeat a section of tape without having to press the transport controls.
- The tape speed can be increased or decreased with the PITCH CONTROL dial in both playback and record, to match pitch or for special effects.
- Punch-in and Punch-out can be engaged using the optional RC-30P footswitch, which gives you an "extra hand" in the recording process.

Precautions and Recommendations

Tape Speed and Track Format

The Portastudio 424 uses a HIGH speed of 9.5 cm/sec. (3-3/4 inches per second) which is two times (2X) the normal speed of a standard audio cassette. Its NORMAL speed is 4.8 cm/sec (1-7/8 i p.s.), the same as that used by conventional recorders. The SLOW speed is 2.4 cm/sec (15/16 i.p.s.), of half the normal speed. It also employs a discrete 4-channel format head developed especially by TEAC for TASCAM multitrack cassette recorders. Here is a comparison of various cassette formats:



Playing back standard (stereo) prerecorded tapes · Tapes recorded on stereo cassette recorders can play back properly on the 424 if you set the track playback, tape speed, and noise reduction type correctly Tracks 1 and 2 roughly follow the standard "stereo" format, but tracks 3 and 4 use the "Side B" (reverse side) tracks. So you must turn off Track 3- 4 playback to avoid hearing the flip side playing backwards. If the cassette was recorded with Dolby B type noise reduction, the DBX switch should be set to OFF

For the same reasons, tapes recorded on the Portastudio 424 will not playback properly on stereo cassette recorders. Material recorded on the 424 must be mixed down to stereo for final distribution.

The 424 needs the entire width of the tape to record its four tracks, eliminating the option of recording on both sides (actually, it's both directions). Therefore, you should decide which side (side "A" or side "B") you want to use and use that side exclusively It's a good idea to get into habit of consistently using the same side on all multitrack tapes.

Tape Type
The Portastudio 424 is internally adjusted for HIGH BIAS "Type II" tape. This means that for best results, you should only use tapes of this type TDK SA, Maxell XL-II or equivalent formulations are recommended. We strongly suggest that you select one good quality brand and use it exclusively The time you spend creating your multitrack master is much more valuable than the money you save by buying inferior tape. The cassette shell essentially becomes a part of the 424's transport. Poor quality shells can cause wrinkles, snarls and shredding of the edges of the tape with use. Even small scratches on the tape oxide can cause "dropouts" (temporary loss of signal) on one or more tracks. High quality tapes are less likely to cause problems in the long run.

Accidental Erase/Record Protection
To protect a finished master tape, it is necessary to punch out both record protect tabs. Even though you are recording in only one direction, the 424 uses the entire width of the tape, as mentioned above. If, for example, you remove only one of the tabs, you could accidentally insert the cassette into the 424 backwards and erase all four tracks of the master

Tape Length
Use the shortest possible tape for a given work. It is not unusual to play a tape 100 times before you are finished, so select a cassette length that is as close as possible to the length of the program you plan to record. Cassettes C-60 length and shorter are often made from thicker stock than longer cassettes.

The tape used in C-120 cassettes is extremely thin and can cause winding problems, crimping, wrinkling, and other damage to the oxide coating of the tape which will destroy your work. Don't use C-120s in the 424.

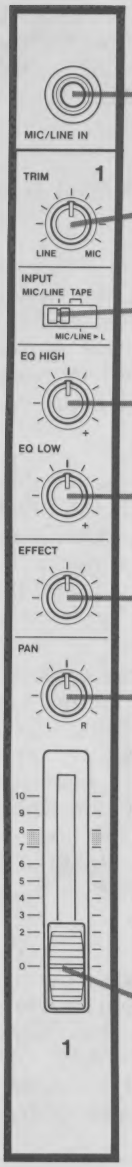
Remember that at 2X normal speed, and the "one-side-only" 4- track single direction format means that you have only 1/4X normal play time:

	(approx.)
C-30	7.5 min.
C-46	11.5 min.
C-60	15 min.
C-90	22.5 min.

Powering the 424
IMPORTANT ! Only use the provided AC adaptor PS-P424 which is designed especially for the Portastudio 424 and provides a convenient connection and correct polarity
Should you attempt to employ an AC-DC converter of any other brand or manufacturer, you will have to make sure that the connection provides the proper polarity as shown by the symbols ⊕-⊂-⊖ above the connector on the back of the unit. Furthermore, the specified voltage of 12 V and amperage of 1100 mA must be properly observed. Otherwise, damage may occur to the Portastudio 424 and ***such damage would not be covered by the limited warranty on the product.***

PORTASTUDIO 424 Brief Guide For detailed information on each feature, see "Features

Input selection and adjustment



MIC/LINE IN (Ch. 1-4) These are the input jacks for the mixer channels. Both lower-level signals (from microhpones and some guitar pickups) and line-level sources (such as electronic instruments) can be connected here.

TRIM (Ch. 1-4) Sets how much preamplification will be added to the MIC/LINE IN jack. Turn to the right if the signal needs amplification, to the left if the signal is so loud it is distorting the mixer electronics.

INPUT Determines where the signal of the channel comes from, and where the INPUT jack signal will go to.

MIC/LINE (left) set the external input as the channel source.

TAPE (center) makes tape playback the channel source, and is used during a typical mixdown or bouncing tracks.

TAPE and MIC/LINE ►L (R) makes tape playback the channel source, and sends the external input directly to the designated Master output (left or right). This is used during mixdown if you want to add external inputs (from MIDI-controlled instruments or an external mixer) while using the channel of the 424 to control tape playback. The input signal goes directly to the LEFT or RIGHT mix, bypassing the channel controls -this makes the IN jack work as a "buss input"

EQ HIGH Cuts or boosts treble frequencies. Shelving point is at 10 kHz.

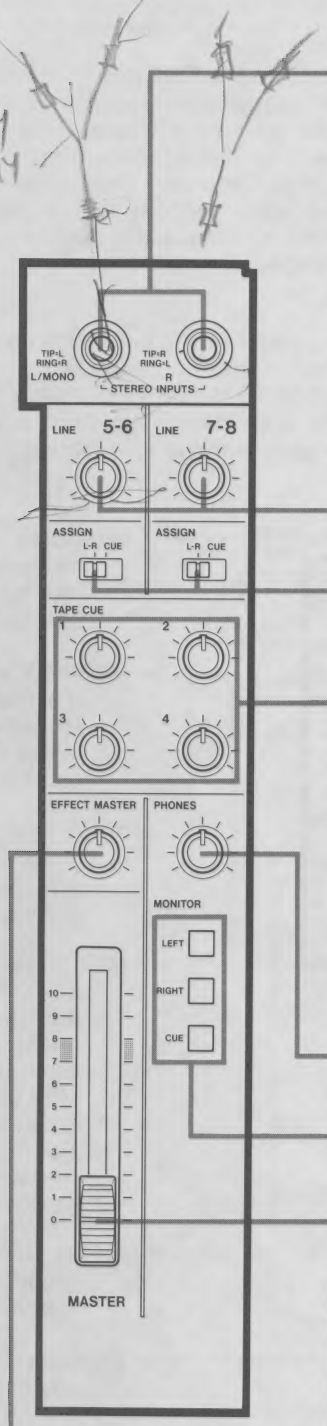
EQ LOW Cuts or boosts bass frequencies. Shelving point is at 100 Hz.

EFFECT A post-fader effect send from the channel. Turn clockwise to increase the level going to the Effect Master

PAN Sets the pan position (left-right balance) of the channel. Note that the Left Mix can be recorded on tracks 1 and 3, and the Right Mix onto tracks 2 and 4.

Channel fader: Sets the volume of the channel feeding the MASTER fader

and Controls", pp. 29-35 of the supplied manual



STEREO INPUTS (Ch. 5-8) Connect any line-level signal (such as an effect return, or electronic instrument) here. They can operate in three different ways.

- Four Sources: By using a special 3-conductor Tip-Ring-Sleeve (TRS) cable, each jack can accept two signals at once (Tip to the left, Ring to the right on Channel 5-6, vice versa on Channel 7- 8).
- Two Sources: If TRS "stereo splitter" cables are not available, standard mono 1/4" cables can be connected to these jacks. In this case, the left (5-6) jack will go only to the Left mix, and the right (7-8) jack will only reach the Right mix.
- One source: Plug a mono cable into the left (5-6) jack and leave the right (7-8) jack empty The signal automatically connects to both channels, making assignment to left and right simultaneously possible.

LINE level control · Controls the volume of the stereo channels.

ASSIGN Sends the stereo channel to either the L-R mix for recording, or the CUE mix for monitoring. If you are using MIDI-sequenced "virtual tracks", connect them to channels 5-8, so they can be sent directly to the CUE mix without being recorded.

Tape Cue, Monitor, and Phones

TAPE CUE 1-4 This section controls tape playback in the headphones, when CUE is pressed in the MONITOR section (An output of the TAPE CUE mix also appears on the Ring connector of the EFFECT SEND jack, so with a special TRS cable CUE can be used as an extra effect send from tape).

PHONES This is the volume control for the built-in headphone amp.

MONITOR switches These select what signals you will hear in the PHONES. You can hear the left and/or right output of the mixer, plus the tape cue mix, depending on what is pressed down.

- The LEFT or the RIGHT switch MUST be Up/Off when only either Left or Right output buss is fed with signal, so you can hear that at the center in the headphones.
- The "TAPE" CUE MONITOR mix is always mono (center) The CUE MONITOR mix from the stereo channels 5-6 and 7-8 may be stereo if they are fed with stereo inputs.

Master Section

MASTER fader This sets the total output level of the stereo mix.

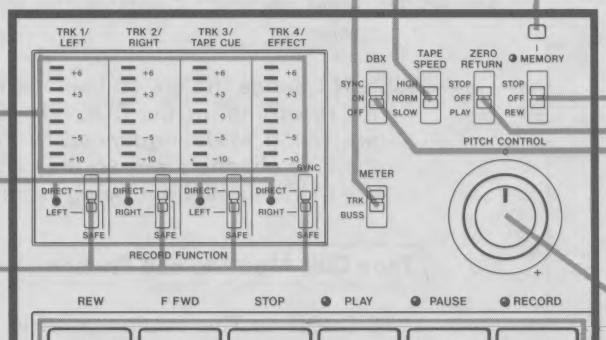
EFFECT MASTER This is the master SEND control for the effect mix.

TRK (Track) LED When a track is in SAFE position, its indicator will light in green. In any other positions than SAFE, it will light in red, regardless of the current transport mode.

Meters . These show the recorded level of the respective tape tracks OR the output level of different sections of the mixer (as set by the METER switch) The average level should be in the center (0), but occasional peaks up to +6 scale are acceptable.

METER switch In the TRK position, the four meters will show the record or playback level of the four tape tracks. This is the normal setting during recording. In the BUSS position, you can meter the output level of the mixer sections (left, right, tape cue, and effect). This is the normal setting during mixdown.

TAPE SPEED HIGH is 3-3/4 ips (9.5 cm/sec.), double the standard (NORMal) cassette tape speed of 1-7/8 ips (4.8 cm/sec.). SLOW is 15/16 ips (2.4 cm/sec.) half normal speed. *SLOW is recommended for practice only.*



MEMORY switch happen when t MEMO point a REWind, or no ef

MEMORY enter key the first time, th is memorized (re clears that memo establishes a nev

ZERO RETURN Det when the transp zero position a PLAY, or no effec

DBX This turns th and OFF for all f it on. In the SYN tracks 1-3, and when using Trac MIDI sync tones When SYNC is o 4's RECORD FU signal from the from mixer Chan

PITCH CONTROL. speed of the tra Play mode, over

Transport keys Th any cassette rec

RECORD FUNCTION switches 1-4: These control which track(s) will be recorded when the master RECORD and the PLAY key is pressed, and choose where the signal to be recorded is coming from ·

DIRECT The track will be recorded with the direct output of the same-numbered channel (channel 1 goes to track 1, etc.) Adjust recording level with the *Channel Fader* only On Track 4, if the dbx switch is in the SYNC position, track 4 will record the signal from the SYNC IN jack instead of from Channel 4.

SAFE The track will not be recorded.

LEFT (1,3) or RIGHT (2,4) The track will be recorded with the Left or Right Mix. Recording level is adjusted by the *Channel Faders* and the *MASTER fader* Any combination of inputs can be recorded at once onto a track, in a mix determined by their PAN controls and faders.

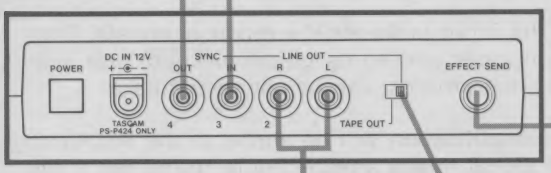
Tape counter (not sh that shows the for autolocation

Counter reset butto change the coun

OUTPUT JACKS: Rear panel

SYNC OUT jack Connect this to the input of a MIDI sync or SMPTE time code reader This jack always gets signal directly from tape track 4.

SYNC IN jack : Connect the output of a MIDI sync or SMPTE time code generator to this jack. When the DBX switch is in the SYNC position, this jack connects directly to the DIRECT side of the Track 4 RECORD FUNCTION switch When the Output Selector switch is in the TAPE OUT position, this jack gets signal directly from tape track 3.



EFFECT SEND Connect this to the input of an effect device.

CUE OUT feature If you have a "stereo splitter" TRS 3- conductor cable, the Tip will receive the EFFECT OUT signal, and the Ring will receive the CUE OUT signal, allowing the use of a second effect device during mixdown, when CUE is not otherwise being used.

■ **NOTE** Since the TAPE CUE section does not get signal from the LEFT and RIGHT mix during recording, the CUE OUT is not intended for connection to a monitoring system Use the PHONES jack for this purpose.

Determines what will
he transport reaches the
utomatic STOP, automatic
fect (OFF).

When this key is pressed
e current counter location
d LED lit). A second press,
ory (LED off). A third press,
w MEMO point (LED lit).

ermines what will happen
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e dbx noise reduction ON
our tracks. Normally, leave
C position, the dbx is on for
off on track 4. Use SYNC
k 4 to record and play back
or time code.
n, the DIRECT side of Track
UNCTION switch gets its
SYNC IN jack, instead of
nel 4.

Increases or decreases the
ansport in both Record or
a 12% range.

ese work the same as on
order

own) A three-digit display
current tape position, used
functions.

on (not shown) Press to
ter to "000"

Output Selector switch This is a "where from" switch it selects the source for the four output jacks next to it. In the left position, the four jacks act as four TAPE OUT jacks, getting signal directly from the multitrack tape without passing through any mixer controls. In the right position, the first two jacks act as LINE OUT Left and Right, jack 3 acts as SYNC IN, and jack 4 acts as SYNC OUT.

LINE OUT L and R jacks Normally, connect these jacks to the Left and Right inputs of your mixdown deck. When the Output Selector switch is in the TAPE OUT position, these jacks will get signal directly from tape tracks 1 and 2 instead of from the stereo output of the mixer

SO YOU CAN PLAY STANDARD (STEREO) PRE RECORDED TAPES, (SEE TOP OF PAGE 10)

These jacks can also be connected to the inputs of external mixers and amplifiers, etc. However, since the TAPE OUT section can not be heard through LINE OUT L-R, they are not intended for connection to a monitoring system Only the PHONES jack gets a mix of cue and stereo.

LET'S TRY THE 424 MIXER

To learn how the mixer works, first you need to plug a signal source into one of the six 1/4" jacks located at upper top of the 424, in your easy reach.

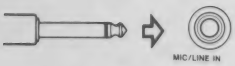
As an example, we'll use a microphone as the source.

Before connections

- Turn all the TRIM controls all the way to the left/LINE position.
- Turn all the EQ controls to their center "0" position.
- Bring all the faders down.
- Turn all the TAPE CUE, EFFECT, and PHONES controls full counterclockwise, and set all the MONITOR switches to OFF (their Up position).
- Turn the LINE 5-6 and LINE 7-8 level controls full counterclockwise, and set the ASSIGN switches to the CUE position.

1 Have in hand a dynamic microphone and a set of stereo headphones.

Source connection



2. Plug the 1/4" plug on your microphone cable into the leftmost MIC/LINE IN jack for channel 1

3. Connect the provided AC adaptor to the DC IN jack, and the other end of the adaptor cable to an AC outlet.

Powering on

4. Turn the 424 on. (The POWER switch is located on the back, next to the DC IN jack.)

Headphones connection

5. Plug your headphones into the front PHONES jack.

Input source

6. Set the channel 1 INPUT switch to the left source MIC/LINE position.

Panning

7 Turn the channel 1 PAN control all the way to the left position.

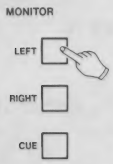
Channel level

8. Raise the channel fader to "7" on the level scale.

Group level

9. Raise the MASTER fader to "7"

Monitor selection



10. Press the MONITOR LEFT switch. The RIGHT switch must be OFF, so you can hear the Left mix at the center in the headphones.

Listening level

11 Turn the PHONES level control up to the 12 o'clock position.

TRIM adjustment

12. While speaking into the mic, slowly turn the TRIM control in channel 1 to the right. You will hear your voice in the headphones.

When using a line level source (such as electronic instruments) instead of the mic, the TRIM does not need to be turned up very far, if at all.

How to Record on Track 1

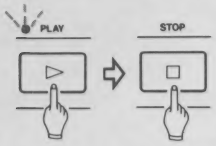
As a trial, let's record your voice on tape.

1 Have in hand a new cassette tape (Type II, C-90 length or shorter). Make sure the DBX switch is set to ON.

Loading a cassette

2. Press on the cassette door's lower right hand corner, and it will spring open. Insert your cassette tape. Close the door

Getting past the leader tape



3. Press PLAY and allow the tape to run for about 10 seconds. This will run the tape leader onto the takeup reel, and put the beginning of the tape in front of the heads.

Resetting the counter

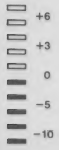
4. Press the Counter Reset button, so you an use the ZERO RETURN function to get back to this point.

Selecting tracks

5. Set the TRK 1 RECORD FUNCTION switch to DIRECT or LEFT The TRK 1 indicator will switch to light in red.

   If you use DIRECT, the METER switch must be in the TRK position. If you use LEFT, the METER switch can be in either TRK or BUSS.

Mic level adjustment



6. Speak into the mic. You will see meter 1 move. If no level or too low a level is shown, continue to speak into the mic and slowly turn the channel 1 TRIM control to the right/MIC until the meter averages at "0" and peaks at "+6"

Beginning to record

7 Hold RECORD and press PLAY to initiate recording.

8. Speak into the mic.

Stopping recording

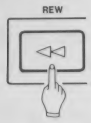
9. Press STOP to stop the tape and terminate recording.

Putting track into "Safe"

10. Set the TRK 1 RECORD FUNCTION switch back to its SAFE position. The TRK 1 indicator will switch to light in green as before.

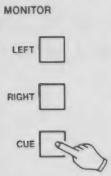
How to Play Back Track 1 through CUE MONITOR

Locating tape to 000



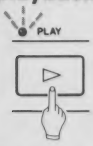
1 Set the ZERO RETURN switch to STOP Press REW The tape will rewind, automatically stopping at counter zero point.

Monitor Selection



2. Press CUE in the MONITOR select switches, so you can hear the tape.
   Turn LEFT off, so you don't hear the noise from the microphone or instrument in the phones.

Begin playback



3. Press PLAY

TAPE CUE level adjustment

4. Slowly turn the TAPE CUE 1 control to the right. You will hear what you have recorded on track 1 in your headphones.

Stop playback

5. Press STOP to stop play

How to Make an Overdub on Track 2

Overdubbing is recording one or more additional tracks on the same tape, while listening to previously recorded tracks using CUE.

Leave the microphone connected to the channel 1 input. There is no need to repatch it to channel 2 to record on track 2. You can continue to use channel 1 because the channel's PAN makes it possible to send any channel to any track of the recorder

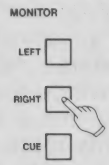
Same levels

1 All level controls should be set the same as they were for the first track the channel 1 fader and MASTER fader at about 7, the TRIM undisturbed, the INPUT at MIC/LINE. All other channel faders, including 5-6 and 7-8, should be off

Panning

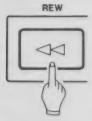
2. Turn the channel 1 PAN control all the way to the right position.

Monitor selection



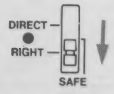
3. Press the MONITOR RIGHT switch (down position). The MONITOR CUE switch should also be on. The LEFT switch should be off

Locating tape to 000



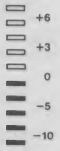
4. Press the REW key, so the tape will rewind to the beginning of the track 1 recording.

Track selection



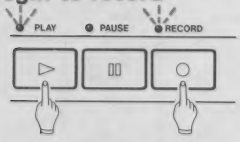
5. Set the TRK 2 RECORD FUNCTION switch to RIGHT The TRK 2 indicator will switch to light in red.

Record level adjustment (TRIM)



6. Speak into the mic to check to see meter 2 move. If no level or too low a level is shown, continue to speak into the mic and slowly turn the channel 1 TRIM control to the right until the meter averages at "0" and peaks at "+6".

Begin to record



7 Hold RECORD and press PLAY to initiate recording.

Monitoring input/tape

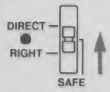
8. You will hear track 1 play, together with the new signal going to track 2, in the headphones, monophonic (centered) as long as the LEFT MONITOR switch is not pressed.
If LEFT is pressed, you'll hear the signal going to track 2 on the right side, and the track 1 playback at the center

NOTE: Adjust only the TAPE CUE 1 control or the PHONES control if you need to change the balance between the old and new track in your headphones. *Leave the Channel and MASTER faders alone,* because they control the level being recorded.

Stop recording

9. Press STOP to stop recording.

Putting track 2 into "Safe"



10. Set the TRK 2's RECORD FUNCTION switch to SAFE, so the indicator switches to light in green as before.

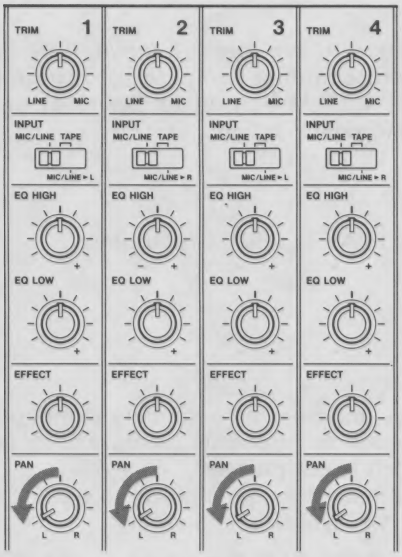
How to Record All Other Tracks

Tracks 3 and 4 can be recorded using almost the same procedure just shown for tracks 1 and 2. Just use the applicable RECORD FUNCTION switches, and the PAN controls should be rotated to the LEFT for recording on Track 3 and to the RIGHT for Track 4.

How to Record Many Sources onto a Single Track

In the first example, we recorded one source onto one track at a time for simplicity But the mixer of the Portastudio 424 can take multiple channels and mix them onto a single track. To do this

- Set the PAN control of each channel to the same setting, for example



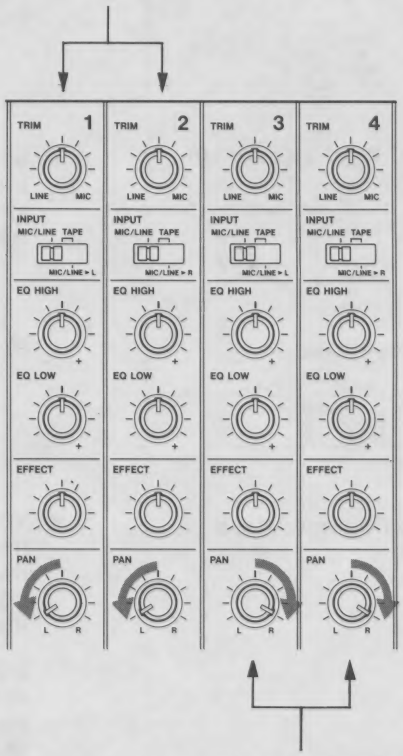
In this example, all instruments plugged into channels 1-4 will be recorded onto Track 1 or 3.

- Lower the MASTER fader to make overall level adjustments once you have each channel's TRIM and fader level set.
- Make sure the INPUT switch of every channel you want to record is set to MIC/LINE.
- *You can't record the stereo channels onto a single track. See also page 38.*

How to Record a Mix onto Two Tracks Simultaneously

If you want to record multiple sources onto two tracks, you use the channel PAN controls to send them to LEFT or RIGHT (or anywhere in between, if you're making a stereo mix). The track RECORD FUNCTION switches choose what track the Left and Right mixes will be recorded on. Note that in this method, the mixer channel number has nothing to do with what track the instrument winds up on. Any mixer channel can be panned to any track.

These mixer channels are being sent to the LEFT, for recording on either Track 1 or Track 3.



These mixer channels are being sent to the RIGHT, for recording on either Track 2 or Track 4.

- Press both the LEFT and RIGHT MONITOR switches (plus CUE if you need to hear tape tracks or MIDI virtual tracks.)

Recording is the same procedure as for one track. In the example above, switch RECORD FUNCTION 3 to LEFT, and RECORD FUNCTION 4 to RIGHT to record on tracks 3 and 4 simultaneously

Restrictions: The 424's mixer section has only two main mixes, Left and Right. For this reason, *you can record only two tracks at once* while you're recording a mix of instruments (for example, two instruments on track 1, three instruments on track 2). Also, *you can record a mix only on combinations of even/odd numbered tracks* (1 & 2, 1 & 4, 2 & 3 etc.). If Track 1 and Track 3's RECORD FUNCTION switches are both in the LEFT position, they will both record the same mix.

Recording the stereo line channels (5-6, 7-8) : It is possible to record up to eight sources simultaneously, using the four standard mixer channels plus the two stereo channels. If the ASSIGN switch is in its L-R position, and the LINE level control is turned up, the LINE signal will be recorded along with any other channels sent to the Left or Right mix. Since there is no PAN control, the signals are set to the "hard left" and "hard right" position.

For more information about Stereo channels see pp. 30-31

Recording on More than Two Tracks Simultaneously · DIRECT

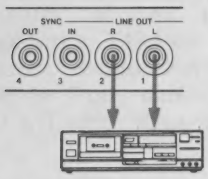
It is possible to record on three or four tracks at the same time by using the DIRECT position of the RECORD FUNCTION switches. In Direct recording, each track gets its signal from a single mixer channel only - Track 3 from channel 3, etc.

- When using DIRECT, the MASTER fader has no effect on the record level. It only affects the level going to the headphones (via MONITOR LEFT and RIGHT switches). Use the CHANNEL FADER only to set record levels.
- The METER switch must be in the TRK position to see recording levels during Direct recording.
- Even when DIRECT is on, a channel still goes to the Left/Right mix. If you record another track with LEFT or RIGHT at the same time, you must check your PAN settings. For example, you can record a vocal DIRECT onto Track 3, and record multiple instruments on Track 1 via LEFT at the same time. But Channel 3's PAN control must be turned hard right, otherwise you'll wind up with vocals "bleeding through" onto Track 1's instruments.
- DIRECT can be used anytime you want to record a single channel to a single track.

How to Mix Down

When the four tracks are all recorded, the final step is mixing them into a standard stereo format. This procedure is known as Remixing or Mixing down. During this procedure the tracks are blended together and balanced to create the desired sound.

Connections

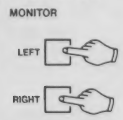


1. Connect the LINE OUT L jack of the 424 to the left line input of the mixdown deck, and the LINE OUT R jack, to the right line input.

Master level

2. Raise the MASTER fader to the shaded area between 7 and 8.

Monitor source



3. Press the LEFT and RIGHT MONITOR selector switches. The CUE MONITOR switch must be UP.

Channel source to tape

4. Set all the INPUT switches on the four input channels to their center TAPE position.

Playback level

5. Press PLAY and, while listening to the tape play, use the channel faders to set each track's relative level for the desired balance. The channel 1 fader is being fed with track 1, the channel 2 fader, with track 2, the channel 3 fader, with track 3, and so on.

6. Adjust the PAN controls to set each track's left-to-right position for the desired stereo image. You may also want to use the EQ controls to adjust the individual tracks for the desired tonality (For using effects, see page 25.)

Review

7. When the signal balance, level, and tonality sound right, rewind the tape, and press PLAY again to check the result.

8. Rewind the Multitrack tape again. Put a blank tape in the mixdown deck and let it play for 10 to 15 seconds, then stop it and reset the mixdown deck's counter to zero.

9. Press PLAY on the 424.

Record level

10. Put the mixdown deck into its "Record Ready" mode, and adjust its input level controls for the desired record level.

11. Rewind the multitrack tape to the beginning of the recording.

12. Put the mixdown deck into Record mode then press PLAY on the 424.

13. When the recording is done, stop both machines, rewind the mixdown tape and listen to it.

If the mixdown tape does not sound right, make the necessary corrections and re-do from the beginning.

Punch-in or Insert Recording

"Punching in" or "insert recording" is when you record over a small section of a previously recorded track in order to fix a mistake or improve a performance, while keeping the rest of the track as before. The mixer settings should be exactly the same as they were during the original recording.

Punch-in/out Procedure

The 424 offers 2 ways to initiate the punch- in. The first is with the transport RECORD key, the second, with the remote foot switch.

In the following example, we'll use track 2 as the punch-in track.

Preliminary

1. Either plug the source into Channel 2 if you're using DIRECT recording, or turn the PAN control all the way to the right if you're recording using RIGHT

   No resetting of the mixer is necessary if you're punching into a track you've just recorded.

Tape monitor

2. To hear the tape, use the TAPE CUE. Press the CUE switch in the MONITOR switch rack. Press PLAY to play the tape. Turn up the TAPE CUE 2 control to the desired level.

Live monitor

3. To hear the instrument, press the MONITOR RIGHT switch, and play the instrument. You'll hear it together with the tape signals in the headphones, in mono (centered) if the MONITOR LEFT switch is Off/Up.
   Adjust the PHONES and TAPE CUE controls for the desired listening level of the headphones.
   Stopping the tape will allow you to hear only the instrument.

4. Set the TRK 2's RECORD FUNCTION switch to the RIGHT position. The TRK 2 indicator will switch to light in red, and the respective meter will show the level from your instrument. If your previous settings were disturbed, adjust the channel fader and the MASTER fader for a level matching that of the original recording.

   Use the TAPE CUE 2 control to set the balance between the new signal and the recorded one in the headphones.

Selecting In and Out Points

For both musical and technical reasons, when punching in or out of a track, you must select points that are "in the clear", i.e., in the pauses between phrases or notes. It sounds unnatural and makes the insert noticeable if you record a new note before the old one has ended, or are holding a note as you punch in or out. Making inserts well requires some practice. Because of the spacing between the erase and record heads, you need to anticipate your in/out points by a fraction of a second for extremely tight cues.

IMPORTANT NOTE . Punch-in erases old material on the track and this change is permanent. A few practice runs made on recordings that you can freely destroy (erase) will get you accustomed to the timing of punching in and out.

Punching-in/out with RECORD

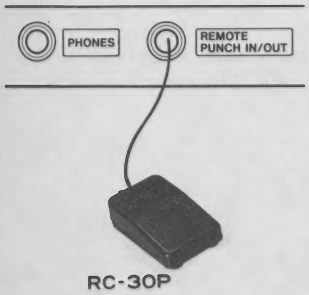
1 Locate the tape to a point a little lower than the expected punch-in point. Then, press PLAY

2. When you reach JUST BEFORE the error, press RECORD. Track 2 starts recording.
   The old material on track 2 is being erased and you'll hear the new material going to that track, along with other already recorded tracks through the corresponding TAPE CUE controls.

3. To punch out of record, press PLAY You will hear the output of track 2 again in the monitor mix.

4. To stop the tape, press STOP

Using the Remote Footswitch (RC-30P)



If you are recording alone and are too busy playing an instrument to push the switches, the use of the optional remote foot switch is really handy

1 Plug the RC-30P into the REMOTE PUNCH IN/OUT jack on the front of the 424.

2. Locate the tape to a point a little lower than the error, then press PLAY

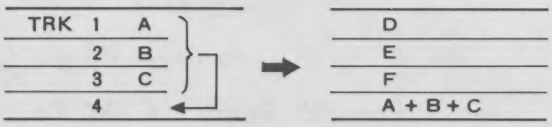
3. When you reach JUST BEFORE the error, press the foot switch. It has the same effect as pressing RECORD and Track 2 starts recording.

4. To punch out of record, press again the foot switch. It has the same effect as pressing PLAY You will hear the output from track 2 again in the monitor mix.

5. To stop the tape, press STOP

Bouncing Tracks (Ping-pong)

The recording capability of the PORTASTUDIO 424 is not limited to four tracks. You can "bounce" or combine tracks you have recorded to an empty track, and then replace the original tracks with new material. A bounce is like a mixdown, except you are recording to one of the tracks of the 424 instead of to an external recorder The following diagrams depict the process.



Bouncing tracks 1-3 onto track 4

Tracks 1-3 available for recording new parts

During a bounce you can add live sources along with the prerecorded tracks, using the "empty" mixer channels not being used for tape playback. This gives you even more ways to add layers to a composition. For example, you can bounce tracks 1-3 along with another "live" part onto track 4, for a total of four parts on one track.

Ping-pong Procedure

In this example, we will combine material from tracks 1, 2 and 3 onto track 4 without live material or effects.

1 Set the INPUT switches of channels 1-3 to the TAPE (center) position.

2. Turn all the PAN controls to the Right.

3. Set the Channel Faders 1 through 3 to 7 All unused faders should be OFF

4. Raise the MASTER fader to 7

5. Press the MONITOR RIGHT switch, and make sure all other MONITOR switches (CUE, LEFT) are OFF

6. Switch the TRK 4's RECORD FUNCTION switch to RIGHT Make sure that all other RECORD FUNCTION switches are set to SAFE with their indicators lit in green.

7 Rewind the tape to the beginning of the song, and press PLAY

8. Use channel faders 1 through 3 to make any necessary level adjustments. You may want to repeat this step several times to get the balance correct.

9. When the balance is right and the level is peaking at "+6" on the TRK 4 meter (or on the RIGHT meter if the METER switch is in the BUSS position), stop and rewind the tape to the beginning of the track.

10. Hold RECORD and press PLAY Track 4 will record a copy of what is on tracks 1-3.

11 You'll hear the mix being recorded on track 4 in the headphones.

12. Once the recording is done, press STOP

13. Switch the TRK 4's RECORD FUNCTION switch back to the SAFE position.

Ping-pong Plus Live Material

You may use any open channels to add "live" material to the tracks being re-recorded. In our example, Channel 4 of the mixer is open, as are the stereo channels. To make use of this

1 Plug the source into the MIC/LINE IN jack 4.

2. Set Channel 4's INPUT switch to MIC/LINE.

3. Turn the PAN control to the Right.

4. Set the TRIM and Channel Fader as for any other recording.

5. Set the other channel faders (1-3) for the final balance. Proceed with the Ping-pong procedure as before.

You will wind up with a mix of the live instruments along with the previously recorded tracks all on track 4.

Adding Stereo Channels to a Bounce

When bouncing tracks using stereo channels 5-6 and 7-8, you must

1 Set the ASSIGN to L-R.

2. Make sure the source you want to add to the mix will feed the correct side. In the example of bouncing to track 4 above, the source must be connected to the Tip of a plug inserted into channel 7-8, or the Ring of a plug inserted into channel 5-6, since these are the only connectors that feed the RIGHT side of the master mix.

For more information, see pp. 30-31, "Stereo Input Section"

Using Effects with the PORTASTUDIO 424

Effects and signal processing is one of the areas where you can really start to have fun customizing your sound, and develop your own unique recording style. Because there are so many possibilities, it also can be confusing. There are many different effect units on the market, all with different controls, types of inputs and outputs, and other characteristics. Read the manual of your effects device, and the following sections to get the complete story of what's possible for your particular situation.

1. **In-line processing:** The processing that's easiest to understand doesn't involve the 424 directly at all. You can plug your instrument directly into the input of the effect device, and plug the output of the device directly into a line input of the 424. The whole signal gets processed (flanged, doubled, limited, delayed etc.), and only one instrument can use that processor Effect pedals for guitar are typically used this way To get a mix of processed ("wet") and original ("dry") signal, the unit must have its own "MIX" or "BALANCE" control.

2. **Send/return mix processing:** This is the most common method of effect processing, especially for reverb and delay. It allows a number of different channels to use the same effect, while allowing you to control how much effect is mixed with each channel Each of the lower 4 mixer channels can send signals to the EFFECT SEND output jack. This output can then be connected to the input of an effect device. The processed signal output from the effect unit is connected back to the Portastudio, using STEREO INPUTS 5-6 or 7-8, which becomes an effect return. This effect return can be sent to either the L-R mix for recording, or the CUE mix (for hearing it only in the headphones) using the ASSIGN switch. This whole path - from the EFFECT SEND to the reverb and back into a STEREO INPUT - is called an effects loop. The EFFECT control on the standard channels and the EFFECT MASTER control determine how much signal goes to the reverb unit; the LINE control on the stereo channels determine how much returns from the reverb unit.

Setting Effect Send Levels

The goal is to keep the effect unit itself from distorting, while staying above the noise that effect units generate. To get the best signal-to-noise from most effects units, you should send it as strong a signal as you can. With a properly set input signal in the 424, the channel EFFECT Send set to about 2 o'clock, and the EFFECT MASTER at about 2 o'clock, you should get a fairly loud signal from the EFFECT SEND jack.
If your effects device has an input level control of its own, it should be set so the meter or signal light of the effects device is just under the overload point on peak signals. When you want to hear less effect overall, turn down the return LINE control, not the EFFECT MASTER.

Setting the Output Level of Effect Devices

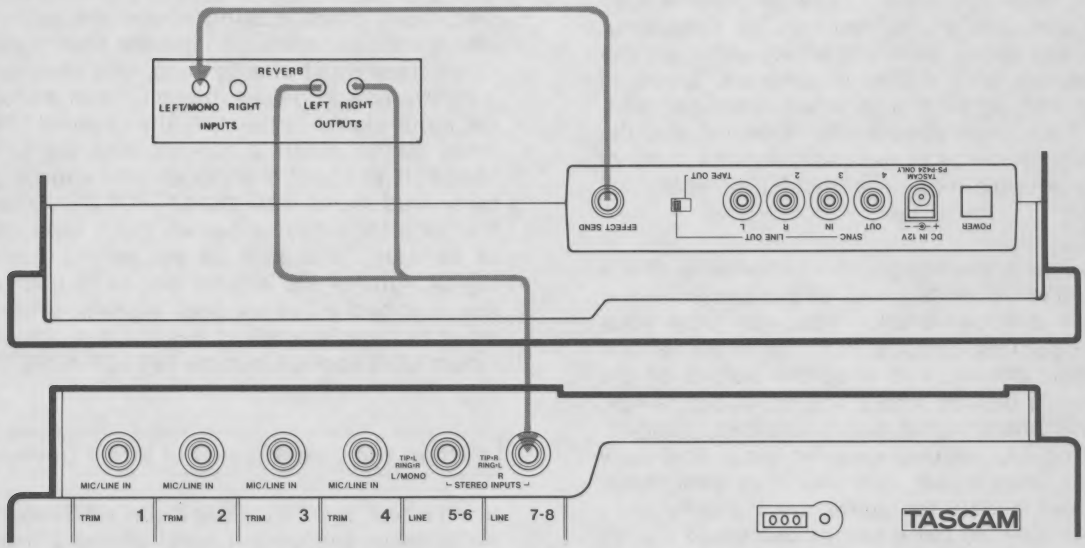
If the effect send level has been set properly, in most cases the output level of the effect unit should be set as high as possible without clipping (distorting) the STEREO INPUTS of the 424, but low enough so that you have a reasonable range of control. If you can get the effect sound you want with the return LINE control in the 12 to 2 o'clock range, you're in the ballpark. If, on the other hand, very small settings of the Effects Return still give you a mix drowning in effects, turn down the output level of your effect device.

Some effect units have rear panel switches setting input and output level ranges between "+4" and "–20 dB". In this case, try setting the input to –20 (high sensitivity) and the output to +4 (full output level).

Setting the Mix/Balance Control on Effect Devices

When it's being used in a send-return mix, set the mix/balance of your effect device all the way to "wet" or full processing with no direct original signal. In send/receive processing, the dry signal goes down the 424's *Channel Fader* to be mixed with the effect return signal at the L-R MASTER. Therefore, you don't need any "dry" signal coming to the effects return. The mix/balance control is set toward "dry" only when you're using the effects device as an in-line processor

How to Connect Your Effects Devices



There is no absolute "right" or "wrong" way to do this--there are several ways, each with its own consequences.

The diagram shows the most common method. EFFECT SEND feeds a reverb unit, which has a synthesized stereo output patched into STEREO INPUTS 7-8. A special "stereo splitter" cable is used, with the 3-conductor (Tip-Ring-Sleeve) end plugged into LINE 7-8, and the other end split to two 2-conductor plugs connected to the Left and Right Outputs of the effect unit.

Mono returns: A special feature of the STEREO INPUTS allows continuously variable control between left and right if desired: a mono effect connected to 5-6 jack will go to both the "5-6" and "7-8" LINE controls if nothing is plugged into the "7-8" jack. In this mono mode, the 5-6 LINE control adjusts how loud the mono effect will be on the Left side, and the 7-8 LINE control how loud it will be on the Right side. You can vary the two controls to send signal anywhere between the two sides, similar to using a PAN control.

Patching effects to an input channel: There's no law that says the output of an effects device must be plugged into a STEREO INPUT, either They can also be plugged into a MIC/LINE IN jack (Channels 1-4) just like any other source, if you are cautious about one thing: make sure the EFFECT controls of those channels are set to the off position. Otherwise, you will be sending the output of the effect device back to itself, which is a kind of feedback. (If the effect device is a digital delay, feedback has the same effect as a regeneration (number of echoes) control). An advantage of returning effects to a main channel is that you can EQ the effect return.

To record reverb onto a track: Switch the ASSIGN switch to L-R, and adjust the controls for the sound you want. Remember that stereo signals must be recorded onto two tracks to keep their "stereo" effect.

To hear reverb in the headphones but not record the reverb: Switch the ASSIGN switch to the CUE position. By pressing the CUE switch in the MONITOR switch rack you'll hear the reverb, but the recording will be "dry".

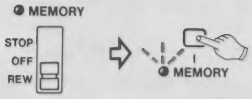
Making an Automatically Repeating Loop

It is convenient when one passage must be repeated over and over to set up an automatic loop using ZERO RETURN and MEMORY

Start point

Locate the tape to the desired start point, and press the Reset button next to the counter Set the ZERO RETURN switch to PLAY

End point



If the red LED next to the MEMORY key is currently on, first turn it off by pressing the key Then, set the MEMORY switch to REW, and at the end of the section you want to repeat, press the MEMORY key again. Its LED will again light, showing you that the memory has been entered.

Once the end point of your loop has been memorized, press REW The tape will be rewound back to the counter zero point, starting automatically playing to the MEMO point.

To stop the sequence

Set the MEMORY switch to STOP or OFF

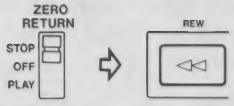
Erasing

The current MEMORY point is erased when the MEMORY key is pressed to turn its LED off The MEMORY is also be erased when the cassette is taken out from the compartment or the power is turned off

NOTE ***The MEMORY STOP and REW functions are active in Record mode too.*** **Before starting recording, be sure to erase the memory or switch the MEMORY switch to OFF, to prevent recording from stopping at an unexpected point.**

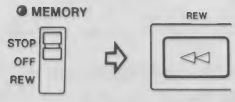
Locating the Tape

To 000



If ZERO RETURN is set to STOP, press either F.FWD or REW to fast wind the tape to the counter zero point.

To MEMORY



If MEMORY is set to STOP, press either F.FWD or REW to fast wind the tape to the memory point.

Recording with Tape Sync - Using the TASCAM MTS-30

The 424 has a SYNC feature that allows you to have your electronic instruments play in sync with the tape. MIDI clocks are themselves a computer type digital language and cannot be recorded on analog tape; it is necessary to convert them to recordable FSK (Frequency Shift Keying) signals using an appropriate converter, such as the MTS-30.

The MTS-30 is not a mere MIDI-FSK converter but translates MIDI clocks into a FSK sync signal containing score "bar" information or "Song Position Pointer", allowing the associated MIDI equipment to stay in sync and follow the tape no matter where you move the tape within a given song. The maximum stability or resolution of the synchronization is ensured by a TEAC-exclusive error correction circuit in the MTS-30.

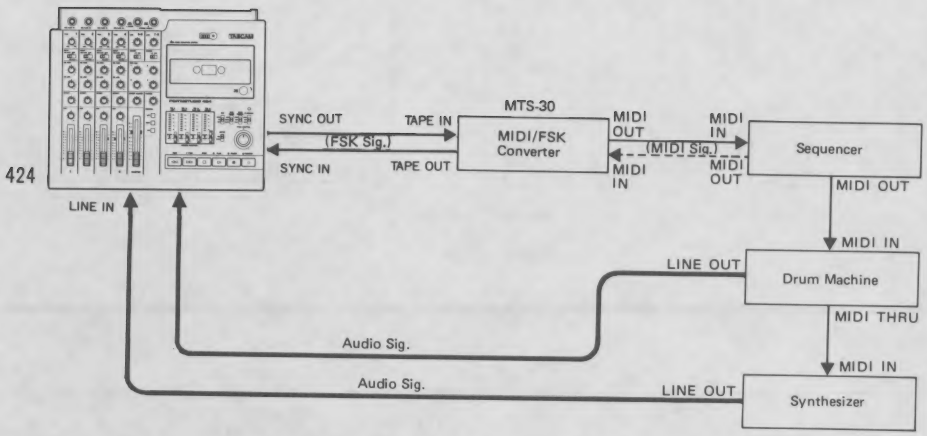
Connections

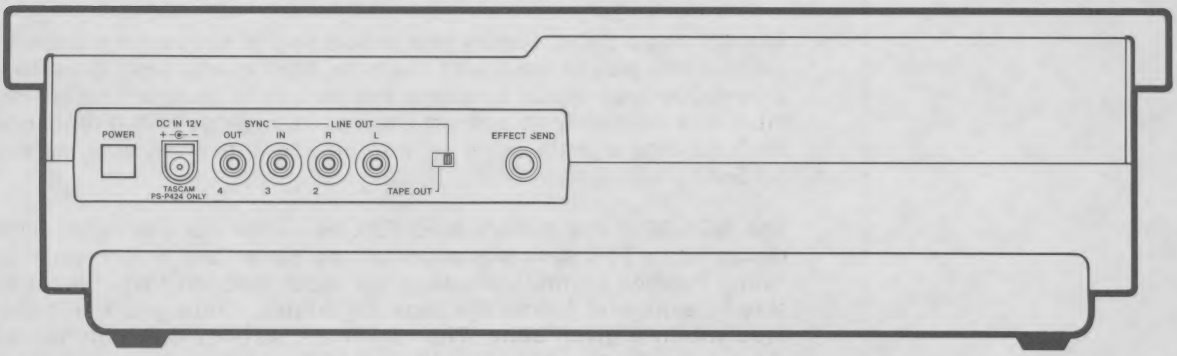
The 424 has dedicated jacks for SYNC tones and can directly record and read them without passing through the 424 mixer A direct connection between the sync tone generator and the 424 recorder ensures that FSK won't accidentally leak into the audio, and unwanted audio won't leak into the FSK tone.

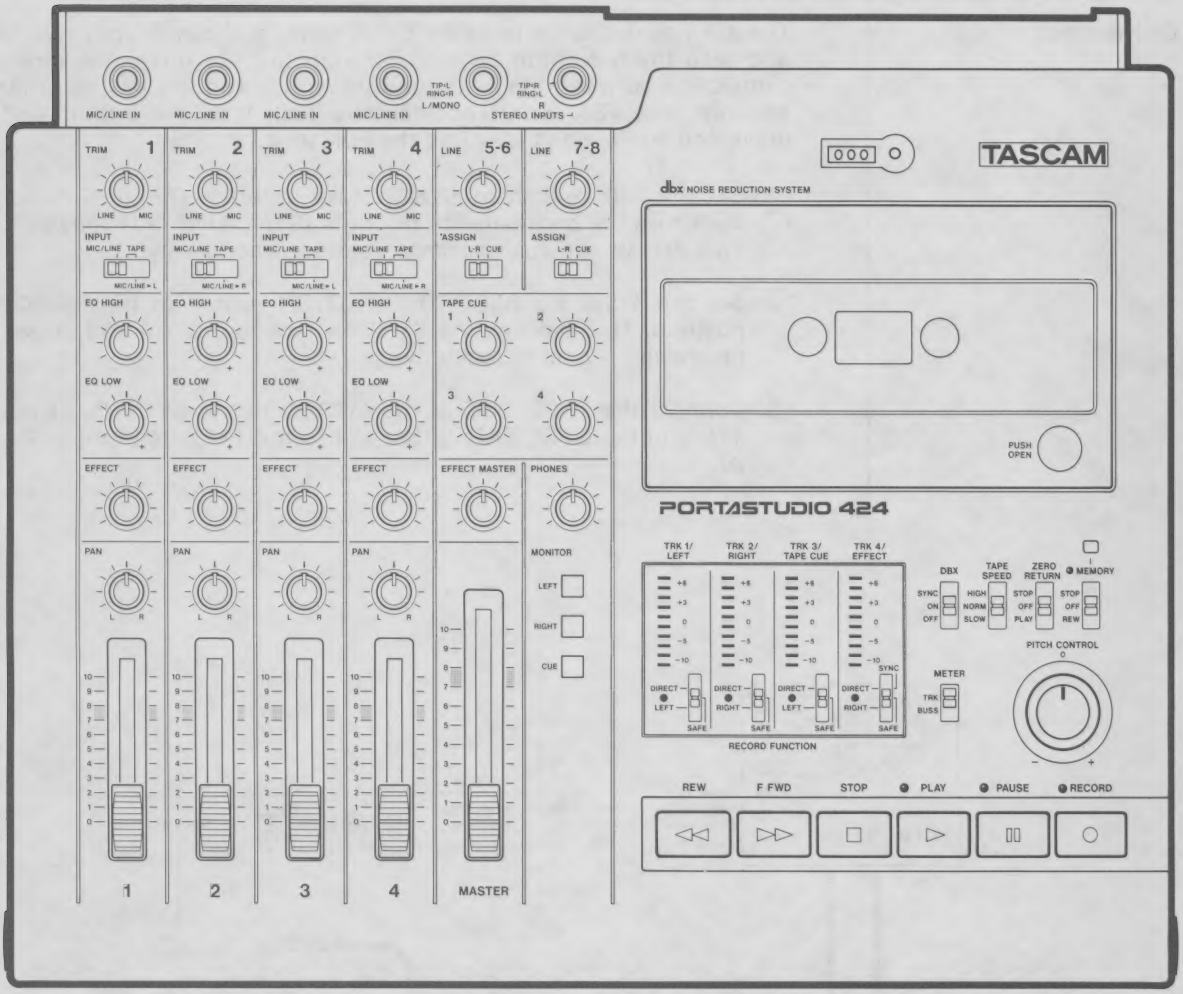
1 Set the DBX switch to SYNC. Make sure the Output Selector switch on the back panel to the right (SYNC-LINE OUT) position. This defeats the dbx encode/decode for track 4 only

2. Set the Track 4's RECORD FUNCTION switch to the DIRECT position. This patches the SYNC IN jack to Track 4 and allows no channel signal to reach there.

3. Connect the TAPE OUT of the MTS-30 to the SYNC IN of the 424, and the SYNC OUT of the 424 to the TAPE IN of the MTS-30.




POWER
DC IN 12V
TASCAM PS-P424 ONLY
SYNC
OUT
IN
LINE OUT
R
L
4
3
2
TAPE OUT
EFFECT SEND


MIC/LINE IN
MIC/LINE IN
MIC/LINE IN
MIC/LINE IN
TIP=L RING=R L/MONO
TIP=R RING=L R STEREO INPUTS
TRIM 1
TRIM 2
TRIM 3
TRIM 4
LINE 5-6
LINE 7-8
LINE MIC
INPUT MIC/LINE TAPE
MIC/LINE►L
MIC/LINE►R
'ASSIGN L-R CUE
ASSIGN L-R CUE
EQ HIGH
EQ LOW
TAPE CUE
EFFECT
EFFECT MASTER
PHONES
PAN
MONITOR
LEFT
RIGHT
CUE
1
2
3
4
MASTER
TASCAM
dbx NOISE REDUCTION SYSTEM
PUSH OPEN
PORTASTUDIO 424
TRK 1/ LEFT
TRK 2/ RIGHT
TRK 3/ TAPE CUE
TRK 4/ EFFECT
DIRECT
SAFE
SYNC
RECORD FUNCTION
DBX
SYNC ON OFF
TAPE SPEED
HIGH NORM SLOW
ZERO RETURN
STOP OFF PLAY
STOP OFF REW
MEMORY
METER
TRK BUSS
PITCH CONTROL
REW
F FWD
STOP
PLAY
PAUSE
RECORD

PHONES
REMOTE PUNCH IN/OUT

1. **DC IN jack** For connection to the provided PS-P424 only

2. **POWER switch :** Turns the 424 on and off

Input Section (Channels 1-4)

3. **MIC/LINE IN jack :** This 1/4" jack accepts unbalanced signals ranging from -50 dBV (3 mV) to -10 dBV (0.3 V), depending on the setting of the TRIM control.

4. **TRIM control .** This sets how much preamplification level there is on the MIC/LINE INputs. When TRIM is turned all the way to the left (LINE position), the preamplifier gain is low, allowing the jack to accept line level sources such as electronic instruments or other -10 dBV output audio equipment. As you turn TRIM up, the preamplifier gain increases, and when you turn TRIM full clockwise (MIC position), the nominal input sensitivity of the jack increases to -50 dBV (3 mV).

5. **INPUT switch** This controls what the source of the channel is, and where the MIC/LINE IN source will go.

   MIC/LINE : The source of the mixer channel is the MIC/LINE INput.

   TAPE (center) The source of the mixer is tape playback from the multitrack.

   TAPE and MIC/LINE ►L (or R) . The source of the mixer channel is still tape playback from the multitrack, but the MIC/LINE IN source connects directly to the MASTER fader, bypassing the mixer controls.

   The left position (MIC/LINE) is used when recording instruments (in Tracking or Overdubbing).

   The center position (TAPE) is used during Mixdown, or while bouncing tracks.

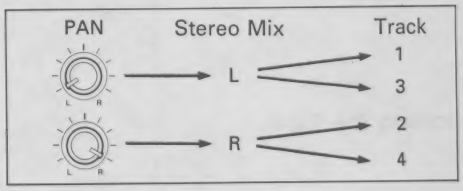
   The right position (TAPE and MIC/LINE► L/R) is used during Mixdown, when you need more inputs for external MIDI virtual tracks. In this position, the MIC/LINE IN jack is acting as a "Sub" or "Buss" input to the stereo mix. The only control that affects it before the MASTER is the TRIM control.

6. **EQ HIGH** This controls the tonality of the high or "treble" frequencies. Turn it to the right to boost the high frequency content of the signal and emphasize its brilliance or brightness. Turning it to the left cuts the high frequency content, if the signal sounds too harsh or shrill. The EQ shelving point is 10 kHz.

7 **EQ LOW** Turned to the right, the control boosts the bass frequencies and the signal will sound relatively heavy Turn the control to the left to cut bass and make the signal sound thinner The EQ shelving point is 100 Hz.

8. **PAN control** · This control allows you to create stereo mixes by sending the signal from the channel fader in continuously variable degree to the left or right side of the stereo mix. If the PAN is set towards the center, it is possible to send to both sides at once.

   The 424 mixer has only two main mix outputs while the incorporated recorder has four tracks. You can record all 4 tracks at one time (using DIRECT), but when recording a mix of multiple sources you must record only 2 tracks at a time one from Left, one from Right. The diagram below depicts how a channel signal goes through the mixer controls to the tracks.



9. **Channel Fader :** This linear control varies the level feeding the MASTER fader and the EFFECT send controls.

   The nominal setting position is between 7-8 (shaded area).

Effect Send Section

Through this section of the 424, channel signals are sent to external devices, primarily effects processors (such as reverb units).

10. **EFFECT control :** This gets its signal from a point just after the channel fader (i.e., "post fader send") and routes the corresponding channel signal to the EFFECT MASTER. Turn the control to the right to send more signal to the EFFECT MASTER.

11. **EFFECT MASTER** · This is the master volume controls for the Effect Send mix. It gets signal from the four EFFECT controls in the channels. It sends signal to the EFFECT SEND jack on the back panel Adjust the EFFECT MASTER until you have the correct level feeding your external effects device. See p. 25, "Setting Effects Send Levels".

12. **EFFECT SEND output jack** This is the output jack for the EFFECT SEND mix of the 424. Signal comes here directly from the EFFECT MASTER level control. It is typically connected to the input of external devices such as reverbs, digital delays, etc. (After the signals are processed, they are usually returned to the 424 via STEREO INPUTS on channels 5-6 and 7-8.) The Effect Send system may also be used to feed a separate monitor, but it will be affected by changes to the fader

Stereo Inputs Section

This section of the 424 includes two stereo signal paths which are equivalent to four additional inputs. You can use these inputs as EFFECT RETURNs.

13. **STEREO INPUTS jacks** These jacks are the 3-conductor stereo (TRS) type. You can connect the outputs of your effects devices to these jacks, but they can be used for any line level input if desired. The nominal input level is -10 dBV (0.3 V) , the STEREO INPUTS have no trim control so it cannot accept microphone signals unless they are preamplified.

    Thanks to their special design, the STEREO INPUTS of the 424 have various functions (refer to diagram on the next page)

    Two Stereo Pairs (using insertion cables)· By using a special cable (sometimes called an "insert" or "stereo splitter" cable, such as the TASCAM PW-2Y or PW-4Y), each STEREO INPUT jack can return two signals (left and right) from a stereo unit. The cable has a 3-conductor stereo 1/4" plug on one end, and at the other end splits into two cables, each with 2-conductor (mono) 1/4" plug. Plug the 3-conductor (tip-ring-sleeve) end into the STEREO INPUT of the 424, and the two mono plugs into the Left and Right outputs of the effect device or synthesizer

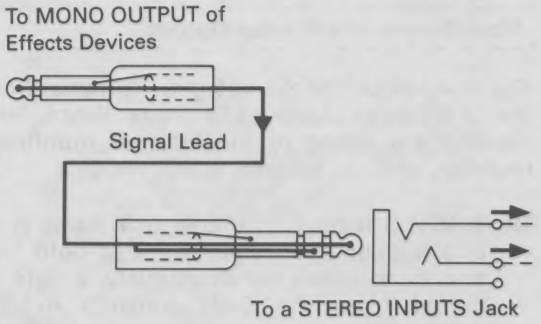
    NOTE: On the 5-6 stereo input, the tip signal is sent to the left, and ring to the right. On the 7-8 input, the signals are reversed (tip to the right, ring to the left).

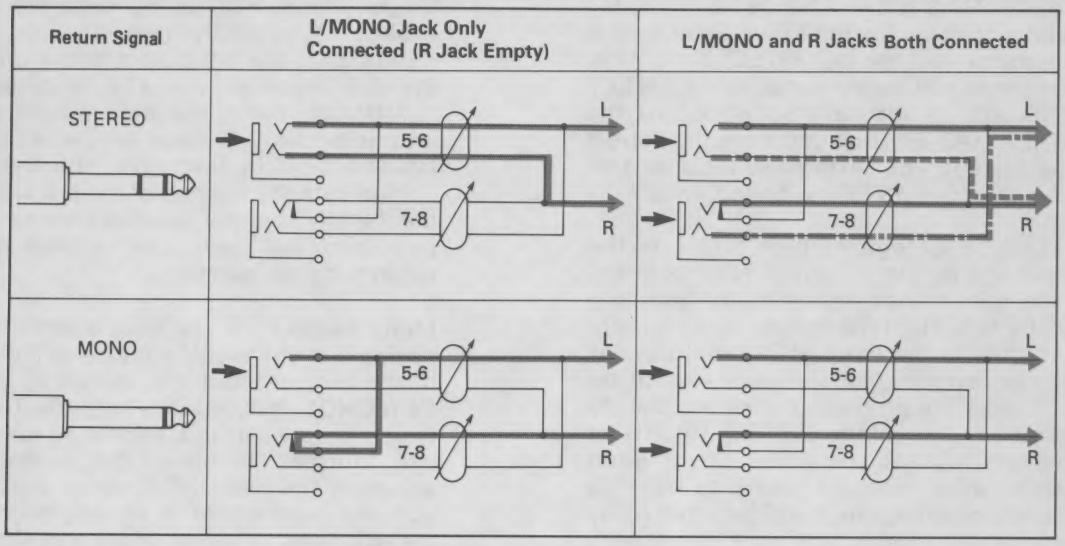
Single Stereo Pair (using separate mono cables)· If you only have standard mono cables, plug the left output of the unit into the 5-6 input of the 424 (also labeled "L/MONO"). Patch the right output of the unit into the 7-8 input of the 424 (also labeled "R"). In this case, the 5-6 LINE control sets the volume of the left side, and the 7-8 LINE control sets the volume of the right side; use both LINE controls for the desired stereo balance.

Mono Feature: If you have a mono-output device that you want to return to the center of the mix, connect that device to the 5-6 ("L/MONO") jack, making sure the 7-8 ("R") jack is empty. In this condition, the signal will "normal" to both LINE controls. By adjusting the two LINE controls separately, you can send signal in varying degrees to the left, right, or center of the mix similar to using a pan pot.

NOTE : If you're feeding a stereo signal to the L/MONO jack, but have nothing in the R jack, make sure that the 7-8 LINE control is turned down all the way, otherwise the stereo picture will become more mono since the 7-8 LINE control will feed some of the left signal to the right side.

Special Mono Adaptor Plug: If you want to convert a Stereo Effect Return to mono operation that will feed the center of the mix but only use one control, wire a cable with a TRS (stereo) plug with the Tip and Ring both connected to the signal lead from the effect device as shown. It is possible to have two mono effect returns feeding the center of the mix if two of these plugs are used. This makes the 424 into a 6 input mixer





14. **LINE level control** · This rotary control varies the level of the Stereo Line channel, in the same way that the Channel fader does for Channels 1-4. The nominal setting position is about "2 o'clock"

15. **ASSIGN switch :** This sends signals coming from the LINE level control either to the L-R MASTER fader, for recording, or to the CUE system for hearing it just in the headphones.

    If a stereo cable is used, the L-R position sends the signals separately to "hard right" or "hard left" If mono cables are used, the L-R switch can send only to one side (Ch. 5-6 to the left, Ch.7-8 to the right). The CUE position sends mono signals to the center of the headphone mix, and stereo signals to its left and right sides.

Main Stereo Mix Master Output

The main output of the 424 gets its signal from the individual channels already listed, and sends them either to the internal multitrack recorder, or to an external mixdown deck.

16. **MASTER fader** · This fader is a stereo type and adjusts the output level of both Left and Right mixes simultaneously It gets its signal from the PAN controls in the channels. It sends signal to the LEFT and RIGHT position of the track RECORD FUNCTION switches, to the LINE OUT L-R jacks on the back panel, and to the MONITOR LEFT and RIGHT switches.

    This fader controls the overall level both for multitrack recording (when not using DIRECT) and for mixdown.

17. **LINE OUT L-R jacks** These jacks are the line-level outputs from the MASTER fader The L and R jacks are typically connected to your two-track mixdown recorder at MIXDOWN. Another use of the LINE OUT jacks is when you want to send the mixer outputs of the 424 to the sub inputs of a larger mixer For these jacks to be active, the Output Selector switch next to the L jack must be in the right position.

Tape Cue and Monitor Section

The MONITOR section allows you to control what you hear in the headphones, without affecting what's printing to tape. The TAPE CUE section is crucial to successful multitrack recording.

18. **TAPE CUE controls 1-4** . These act as a separate 4x1 submixer Each control gets signal directly from the corresponding tape track. You turn each control to set the level of each track in the CUE mix. These controls are totally separate from the Channel controls and the MASTER.

    The output of the TAPE CUE submixer appears at the MONITOR CUE switch, and at a special Ring connection of the EFFECT SEND jack.

19. **MONITOR (headphones) selector switches** These control where the signal in your headphones is coming from. They can be used in combination.

LEFT · Press this to hear the Left output of the mixer, so you can hear the sources going to tape during recording. To hear the Left output at the center in the headphones, the *RIGHT* switch must be OFF.

RIGHT : Press this to hear the Right output of the mixer To hear the Right output at the center in the headphones, the *LEFT* switch must be OFF

If only either side of the stereo mix is active and both the LEFT and RIGHT switches are on, that left or right buss feeds the corresponding side of the headphone mix and cannot be heard at the center

CUE . Press this to hear the TAPE CUE section, so you can hear what's being played back from the multitrack tape while overdubbing.

The stereo channels (5-6/7-8) are also be heard without recording by pressing this CUE switch if their ASSIGN switch is in the CUE position.

The *TAPE* CUE mix is always in the center The *Stereo Channel* CUE mix can either be stereo or mono, depending on what signal is plugged into jacks 5-6 and 7-8. See also "Stereo Input Section", items 13-15.

NOTE . *Don't use CUE when bouncing tracks* - you won't get an acccurate picture of the mix in your phones.

20. **PHONES control** This sets the level you'll hear in the headphones from the MONITOR selector switches.

21. **PHONES jack** . Connect any stereo headphone (with a 1/4" stereo TRS 3-conductor plug) to this jack.

22. **TAPE CUE jacks** · When the Output Selector switch (#23) is set to the left (TAPE CUE position), jacks 1-4 on the rear panel get signal directly from the tape (jack 1 from track 1, jack 2 from track 2...). Use them if you want to mix the tape down with an external mixing console, or if you want to make a backup copy of your master 4-track onto another tape deck.

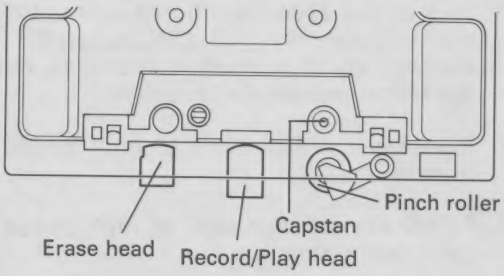
23. **Output Selector switch** : Determines where the four jacks on the rear panel get signal from. When the switch is set to the right, jacks 1 and 2 receive their signal from the stereo MASTER fader, and jacks 3 and 4 act as SYNC IN and SYNC OUT, repectively, when using with the MTS-30 or other synchonizers. When the Output Selector switch is set to the left, jacks 1-4 are switched to carry play signal of the four tracks.

Recorder section

Cassette Loading and dbx System

24. **Cassette compartment door** : To insert or remove a cassette, push on the door's lower right hand corner (marked PUSH OPEN). Once a cassette is inserted, be sure to close the door This will prevent objects, dust or liquids from falling into the tape path.

Tape path components



25. **DBX switch** . When this switch is set to its ON position, the built-in dbx noise reduction system for all 4 tracks is turned on This is the normal position for all recording and playback.

When it is set to the SYNC position, Track 4 is disconnected from the dbx system, so the process does not affect the sync signals going to and from track 4, but tracks 1-3 still go through the dbx encode/decode process. SYNC also connects the DIRECT side of Track 4's RECORD FUNCTION switch to the SYNC IN jack, so an incoming sync signal does not pass through the mixer Use the SYNC position for recording and playback of FSK sync or SMPTE time code.

The OFF position turns off the dbx noise reduction completely Use this position when playing back tapes made with no noise reduction, or with Dolby B type NR.

The dbx NR system provides a net noise reduction (broadband, not just hiss) of about 30 dB, and also permits a net again in tape headroom of about 10 dB, allowing recordings over a 90 dB dynamic range.

Transport Controls

26. **TAPE SPEED:** Controls the speed of the transport in both record and playback.

    HIGH (3 3/4 i p.s., 9.5 cm/sec.) is the position you should use for master recording, since it offers slightly better frequency response and signal-to-noise ratio than standard speed. In high speed, a C-60 offers 15 minutes of 4-track recording.

    NORM is standard cassette speed of 1-7/8 i.p.s. (4.8 cm/sec.). It offers compatibility with other cassettes, acceptable sound quality for less critical work, and 30 minutes of recording on a C-60.

    SLOW (15/16 i.p.s., 2.4 cm/sec.) is half normal speed. A standard tape played back at this speed will be an octave below the original key SLOW is useful for studying complex musical passages, but is *not recommended for recording.*

27 **REW key** Winds tape at high speed in reverse.

28. **F.FWD key** : Winds tape at high speed in the forward direction.

29. **STOP key** Stops any tape motion and disables all transport modes.

30. **PLAY key** *a)* Pressing this key alone starts playback. *b)* If pressed together with RECORD when the transport is in Record Ready with any RECORD FUNCTION switches are at other positions than SAFE, it starts recording ("punch in"). *c)* Pressing the key during recording stops the recording ("punch out") without stopping the tape motion.

31. **PAUSE key** Temporarily stops play or recording To resume the function interrupted, press PLAY *(not PAUSE).*

32. **RECORD key** Hold this key and press PLAY, or press the sole RECORD when tape is playing, to start recording on the track or tracks as selected by the RECORD FUNCTION switches.

    CAUTION For clear punch-in and out, don't start and terminate recording with the RECORD FUNCTION switch *If the RECORD LED blinks,* it shows that all RECORD FUNCTION switches are at SAFE. If this occurs, first press STOP to deactivate RECORD (and PLAY if this also was pressed), and put the desired track(s) into a Ready mode (by setting their RECORD FUNCTION switch to other positions than SAFE) Only thereafter start recording by holding RECORD and pressing PLAY, or by hitting RECORD after having had tape start playing with PLAY

33. **PITCH CONTROL dial** Provides a plus or minus 12% variation to the tape speed in both record and play modes. Turn the dial to the left to lower the speed, or to the right to increase the speed. Set the dial to the center "0" position for the tape to run at the standard speed.

    This can sometimes be used to save parts that are a little out-of-tune, or to create sound effects such as flanging. Note that if you record with the dial at its maximum or minimum settings, you will NOT have the ability to make further adjustment in that direction upon playback.

    CAUTION The PITCH CONTROL dial affects the record speed also. Check to make sure that the dial is at its center "0" position unless you are using the function intentionally.

34. **REMOTE PUNCH IN/OUT jack** For connection to the optional RC-30P remote footswitch.

Track Controls

35. **RECORD FUNCTION switches 1-4** These switches put the respective tracks into Record Ready Recording starts when RECORD is pressed after or together with PLAY
    In the center position (SAFE) no recording takes place.

    NOTE Don't operate the RECORD FUNCTION switches to punch in and out. Otherwise, "clicks" will remain on tape.

    In SAFE, the respective track indicator lights in *green. In any other positions than SAFE,* the indicator lights in *red,* regardless of the current transport mode.

The RECORD FUNCTION switches also select what source will be recorded. For example, Track 1 can record either the single source plugged into Channel 1 of the mixer (DIRECT), or the entire LEFT mix (which may have as many as six sources). The other RECORD FUNCTION switches work in the same way· either DIRECT from the same-numbered mixer channel, or from the MASTER stereo mix: Tracks 1 & 3 from LEFT, Tracks 2 & 4 from RIGHT

The DIRECT position of Track 4 also has a SYNC function. If the dbx switch is in the SYNC position, Track 4 will be recorded with the signal from the SYNC IN jack on the rear panel, instead of the direct output from Channel 4 of the mixer

Displays

36. **METERS and METER SWITCH:** These four meters have two modes, set by the METER switch: TRACK, and BUSS.

TRACK . This is the best setting for recording. The meters will display only when a tape is playing back, or when a track is in a Record or Ready mode. When a track is in SAFE mode, the meter shows the playback level When it is in a Record mode, the meter shows the signal coming from the mixer (either DIRECT or LEFT/RIGHT).

Transport Mode	TRK RECORD FUNCTION Indicator	Measured
Play	Green SAFE	From Tape playback (Output)
Any others than Play		(No display)
Play	Ready	From Tape playback (Output)
Any other modes than Play and Record		From mixer output (Direct from Channel, left, or Right)
Record (RECORD and PLAY both ON)	Red Record	

BUSS: This is the mode to use when you want set levels of the mixer, before entering a Record mode, or even if no tape is in the transport. Each mixer output is metered: LEFT, RIGHT, TAPE CUE, and EFFECT Use BUSS when you need to meter the output of the mixer, such as at mixdown or when setting effect send levels.

In any mode, 0 VU corresponds to an output level of -10 dBV (.316 volts).

37. **Tape Counter and Reset button** This 3-digit counter displays the distance the tape has moved from a zero reference point. Each time you press the adjacent small button, a new zero reference point is established.

38. **ZERO RETURN:** In the STOP position, the transport will automatically stop when it is rewound (or fast forwarded) to the zero counter position.

In the PLAY position, the transport will automatically enter the Play mode when it is rewound (or fast forwarded) to the zero counter position.

39. **MEMORY entry key** : This memorizes the current counter position, as a second autolocation point. When the red LED is lit, it shows that this key has already been pressed, and there is a position in the 424's memory Pressing it again will erase this point. A third press, will establish a new MEMORY point.

Resetting the tape counter to 000 does not move the MEMORY point.

40. **MEMORY switch:** In the STOP position, the transport will automatically stop when it reaches the Memorized counter position (from Play, Rewind, or Fast Forward modes).

In the REW position, the transport will automatically rewind when it reaches (in Play or Fast Forward modes) the memorized counter position.

CAUTION ***The MEMORY function is active in Record mode too.*** **To prevent tape from stopping at, or rewinding from an unexpected point, be sure to set the switch to OFF before starting recording.**

SYNC Features

41. **SYNC IN jack** This typically accepts FSK-converted MIDI sync signals from devices such as the TASCAM MTS-30.

    For the SYNC IN jack to act as such, the Output Selector switch next to the EFFECT SEND jack must be set to the right position.

    When the DBX switch next to the TRK 4/EFFECT meter is set to SYNC, track 4 is electronically disconnected from the dbx noise reduction system, and the SYNC position of the Track 4's RECORD FUNCTION switch receives signals from the SYNC IN jack. When the 424 is in Play mode, track 4's play signal is sent directly to the SYNC OUT jack. Note that Track 4 play signal goes also to the TAPE side of the channel 4's INPUT switch. Be sure to set the switch to the left MIC/LINE position to stop sync tones going down the channel.

    If you wish to use Track 4 for standard recording instead of SYNC tones, set the DBX switch to ON

42. **SYNC OUT jack** FSK tones recorded on track 4 are sent out from this jack to the MTS-30 or other synchronizers.
    This jack always gets its signal directly from track 4.

Care And Maintenance

Even though the heads used in your 424 have high wear resistance and are rigidly constructed, performance degradation or electro-mechanical failure can be prevented if maintenance is performed regularly.

CLEANING

The first things your will need for maintenance are not expensive. The whole kit with the swabs and fluids you will need for months will cost less than a couple of high quality cassettes.

We cannot stress the importance of cleaning too much. Clean up before each session. Clean up after every session. Clean up every time you take a break in the middle of a session.

Here's why·

1 Any dirt or oxide build-up on the heads will force the tape away from the gaps that record and playback. This will drastically affect the response. Even so small a layer of dirt as one thousandth of an inch will result in degraded preformance. All the money you have paid for high performance will be wiped out by a bit of oxide. Wipe it off with head cleaner and you're back to normal.

2. Tape and tape oxide act very much the same way as fine sandpaper The combination will slowly grind down the tape path. If you do not clean off this abrasive material on a regular basis, the wear will be much more rapid and will become irregular Even wear on heads can be compensated for with electronic adjustments for a while, but uneven wear can produce notches on heads and guides that will cause the tape to "skew" and skip around, making adjustment impossible. This ragged pathway also chews up the tape, producing more abrasive material which in turn causes more uneven ear This begins a vicious circle that cannot be stopped once it gets a good start. The only solution to this will be to replace not ony the heads, but the tape guides as well Being conscientious about cleaning the tape path on your 424 will more than double the life of the heads and tape guides.

Cleaning the Heads and Tape Guides

All heads and metal parts in the tape path must be cleaned after every 6 hours of operation, or before starting and after ending a recording session.

1 Open the cassette door

2. Using a good head cleaning fluid and a cotton swab, clean the heads and tape guides until the swab comes off clean. Wipe off any excess ceaning fluid with a dry swab.

Cleaning the Pinch Roller

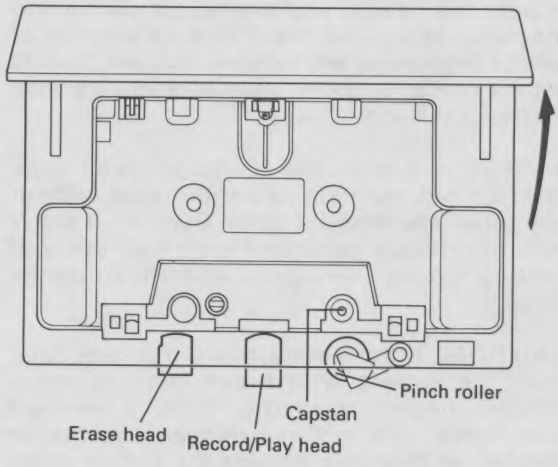
Clean the pinch roller at least once each day the deck is used. Use a good rubber cleancer

1. Clean the pinch roller with a cotton swab moistened with rubber cleaner, until there is no visible residue on the pinch roller

2. Using a clean cotton swab, wipe off all excess rubber cleaner from the pinch roller Make certain that there is no foreign matter remaining on the pinch roller

Cleaning the Capstan Shaft

After cleaning the pinch roller, clean the capstan shaft with a cotton swab moistened with head cleaning fluid.



DEGAUSSING (DEMAGNETIZING)

A little stray magnetism can become quite a big nuisance in tape recording. It only takes a small amount (.2 Gauss) to cause trouble on the record head. Playing 10 cassettes will put about that much charge on the heads. A little more than that (.7 Gauss) will start to erase high frequency signals on previously recorded tapes. You can see that it's worth taking the trouble to degauss regularly.

DEGAUSSING IS ALWAYS DONE WITH THE RECORDER TURNED OFF If you try it with the electronics on, the current pulses produced by the degausser will look just like audio signals to the heads. These pulses are around 10,000 Gauss, and will seriously damage the electronics and/ or meters. Turn off your 424, then turn on the degausser at least 1 m (3 feet) away from the recorder

Be certain that your degausser has either a plastic cover or plastic tape covering the tip. Make sure that no metal ever touches the tape heads as it will scar them and ruin them.

Slowly move in to the tape path Move the degausser slowly back and forth, touching lightly all metal parts in the tape path. Slowly move it away again to at least 1 m (3 feet) from the recorder before turning if off.

Be sure to concentrate while you are degaussing. Don't try to hold a conversation or think of anything else but the job you are doing. If the degausser is turned on or off by accicent while it is near the heads, you may put a permanent magnetic charge on them that no amount of careful degaussing will remove. You will have to get the heads replaced. Make sure you are wide awake for this job.

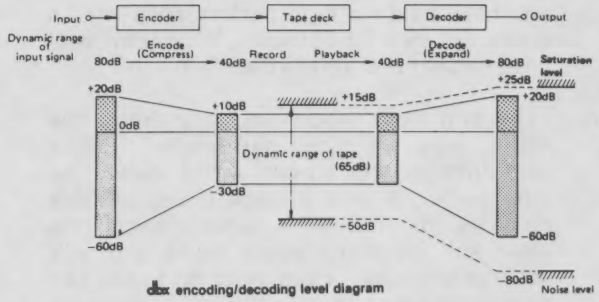
A clean and properly demagnetized tape recorder will maintain its performance without any other attention for quite a while. It won't ruin previously recorded material, nor will getting it back to original specifications be difficult.

CAUTION: If the surface of the unit gets dirty, wipe the surface with a soft cloth or use a diluted neutral cleaning fluid. Clean off thoroughly ***Do not use thinner, benzine, or alcohol, as they may damage the surface of the unit.***

The DBX is a wide-band compression-expansion system which provides a net noise reduction (broadband, not just hiss) of a little more than 30 dB. In addition, the compression during recording permits a net gain in tape headroom of about 10 dB.

A compression factor of 2·1 is used before recording; then, 1:2 expansion on reproduce. These compression and expansion factors are linear in decibels and allow the system to produce tape recordings with over a 90 dB dynamic range – an important feature, especially when you're making live recordings. The DBX employs RMS level sensors to eliminate compressor-expander tracking errors due to phase shifts in the tape recorder, and provides excellent transient tracking capabilities.

To achieve a large reduction in audible tape hiss, without danger of overload or high-frequency self-erasure on the tape, frequency pre-emphasis and de-emphasis are added to the signal and RMS level sensors.



dbx encoding/decoding level diagram

SUBSONICS AND INTERFERENCE

The DBX incorporates an effective bandpass filter. This filter suppresses undesirable subsonic frequencies to keep them from introducing errors into the encode or decode process. However, if rumble from trains or trucks is picked up by your microphone and fed to the DBX, modulation of the program material during low level passages may occur This low-frequency component will not itself be passed through the recorder and so, will not be present at reproduce for proper decoding. If this low-level decoding error is encountered, and subsonics are suspected, we suggest the addition of a suitable high-pass filter in the Microphone Line.

Some Commonly Asked Questions about the Portastudio

Q. I plugged into track two, but it didn't record there. Why?

A. First of all, it's impossible to plug into a track. You plug instruments into a channel of the mixer The word track, in recording, refers to the actual path that your signal makes on the magnetic tape An instrument plugged into channel two can be recorded on any of the four tracks, depending on the setting of the RECORD FUNCTION and PAN controls. When the RECORD FUNCTION is set to DIRECT, that is the only time when a channel source has to go to the same numbered track.

Q. The first track I recorded winds up bleeding onto all the other tracks. How can I avoid that, and keep each part on a separate track ?

A. The most common cause of this is the bad habit of switching the INPUT of the first track to the TAPE position for playback, instead of monitoring on the TAPE CUE. Don't switch to TAPE on a channel unless you intend to mix down or bounce.

Q. The instrument I'm recording is really loud in the room, and even when the TAPE CUEs are up all the way, they're not loud enough over the live instrument. How can I hear less of the live instrument in the headphones?

A.
- Make sure the first tracks were recorded at the proper level, and that the new track isn't clipping on the meter
- Obtain closed-cup headphones to block acoustic sound.
- If you're recording using DIRECT, you can lower the MASTER fader to decrease the level of the live instrument in the phones without affecting the recording level.
- Turn off the LEFT and RIGHT MONITOR switches completely, if you can hear enough of the live instrument acoustically

Q. Why can't I get the stereo line inputs to record onto a track?

A.
- The RECORD FUNCTION cannot be in DIRECT - only LEFT or RIGHT
- The line inputs are not connected to the correct side (for example, the Tip of the 5-6 connector feeds the LEFT buss only, the Ring feeds RIGHT only).
- If there is a stereo source, it must be recorded onto two tracks. To record it onto one track, you must repatch the instrument into two mono channels and mix the sides together

Q. I have an external mixer How can I connect it to the 424, and how should the levels be set?

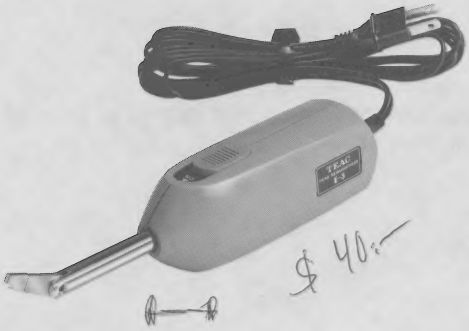
A.
- The unbalanced outputs of any mixer that can be adjusted to have a -10 dBV (.316 volt) output may be connected to any of the input jacks of the Portastudio.
- If connected to inputs 1-4, set the TRIM control to the LINE position.
- It is better to connect the external stereo mixer to the stereo LINE channels (5-6 or 7-8) since it can be assigned to CUE there. This is important so you can hear MIDI virtual tracks in the headphones while leaving the Portastudio's mixer free to record vocals etc. onto tape. At mixdown (or if you want to record the external mixer sources onto a track), set the ASSIGN switch back to the L-R position.
- The external mixer should be set for its own best signal-to-noise ratio. If the signal is too loud on the 424's meters when the Channel and MASTER faders are set to 5 or less, you will have to lower the Master output level of the external mixer

Optional Accessories

RC-30P Remote Footswitch

MTS-30 MIDI-Tape Synchronizer

Head Demagnetizer



PW-2Y/PW-4Y Insertion Cable

TZ-261 Cleaning Kit (Except U.S.)

HC-1 Head Cleaner & RC-1 Rubber Cleaner (U.S.only)

Specifications

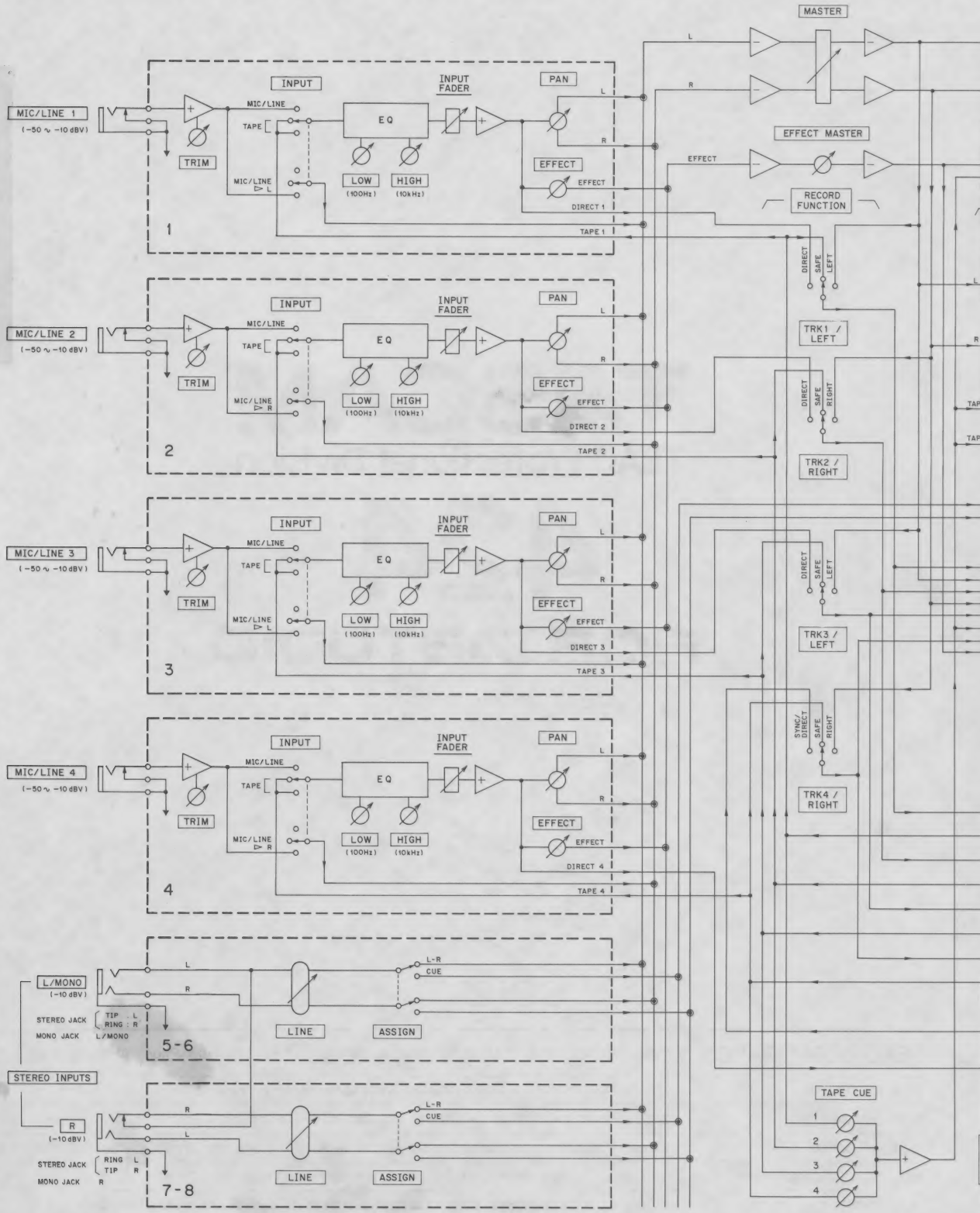
Mechanical Characteristics

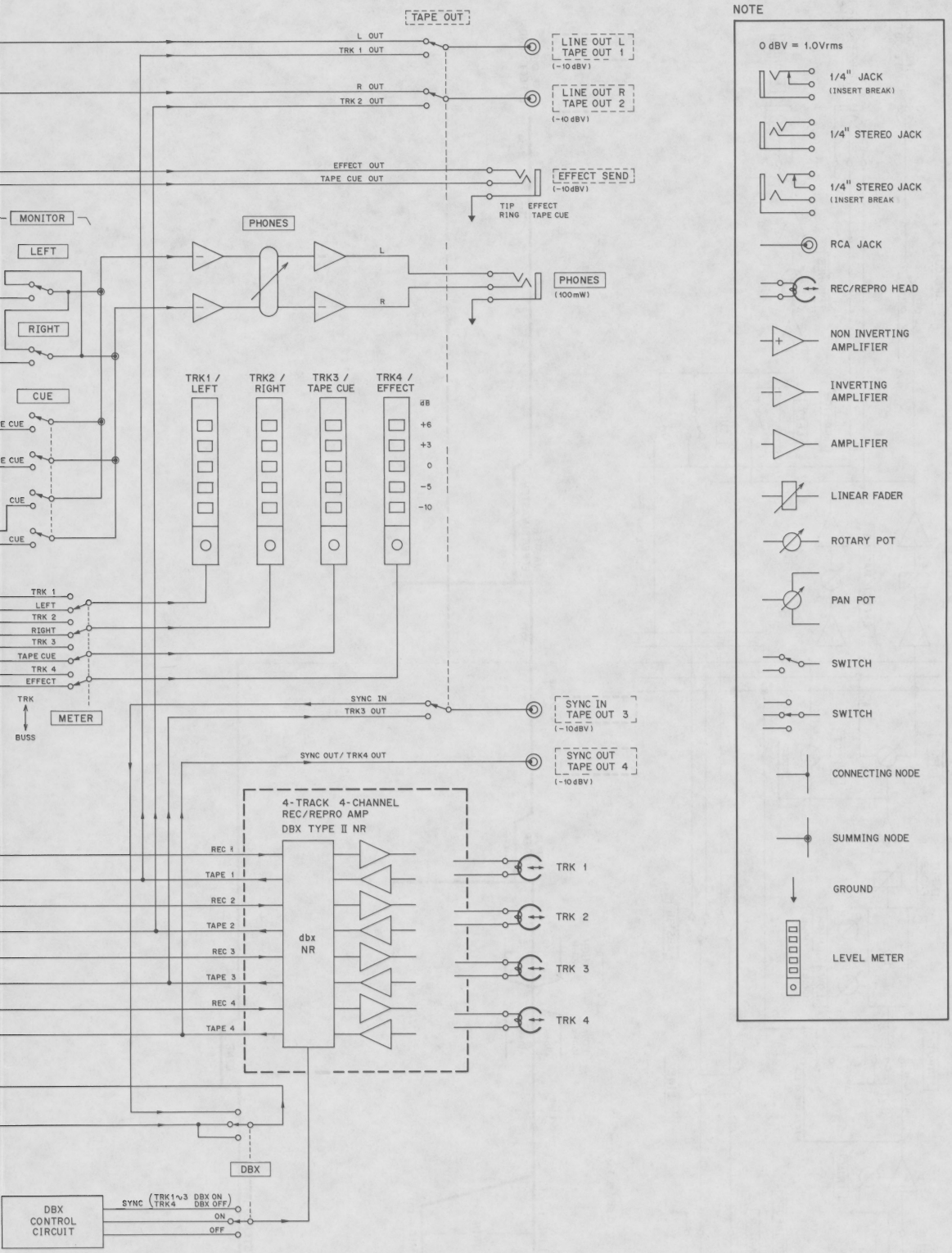
Tape:	Compact Cassette (C-30 to 90), High- Bias (Type II, CrO2)
Track Format:	4-track/4-channel, single directional record/play
Head Configuration:	4-channel record/play (Permalloy) ×1
	4-channel erase (ferrite) ×1
Motor:	DC servo capstan motor ×1
	DC reel motor ×1
Tape Speed:	HIGH: 9.5 cm/sec.(3-3/4 ips)
	NORM: 4.8 cm/sec.(1-7/8 ips)
	SLOW: 2.4 cm/sec.(15/16 ips)
Tape Speed Accuracy:	±1% (at HIGH and NORM)
Pitch Control:	±12 % (approx.)
Wow and Flutter:	0.07% WRMS, ±1.2% W.Peak at NORM
	0.05% WRMS, ±1.0% W.Peak at HIGH
Fast Winding Time:	100 sec. (approx.) with C-60
Dimension (WxHxD):	366 x 110 x 304 mm (14-7/16" x 4-5/16" x 11-15/16")
Weight:	2.5 kg (5.51 lbs)

Electrical Characteristics

MIC/LINE IN (1/4" phone jack x4)	
Input Impedance:	50k ohms
Nominal Input Level:	–50 dBV (3mV) at Trim Max. –10 dBV (0.3 V) at Trim Min.
Maximum Input Level:	+6 dBV (1.8 V) at Trim Min.
STEREO INPUTS (1/4" stereo phone jack x2)	
Input Impedance:	10k ohms
Nominal Input Level:	–10 dBV (0.3 V)
Minimum Input Level:	–16 dBV (0.15 V)
LINE OUT L & R/TAPE OUT 1-2 (RCA jack x2)	
Output Impedance:	1k ohms
Nominal Output Level:	–10 dBV (0.3 V)
SYNC IN/TAPE OUT 3 (RCA jack x1)	
Input Impedance:	5k ohms
Nominal Input Level:	–10 dBV (0.3 V)
Output Impedance:	1k ohms
Nominal Output Level:	–10 dBV (0.3 V)
SYNC OUT/TAPE OUT 4 (RCA jack x1)	
Output Impedance:	1k ohms
Nominal Output Level:	–10 dBV (0.3 V)
EFFECT SEND/Tape Cue Out (1/4" stereo phone jack x1)	
Output Impedance:	1k ohms
Nominal Output Level:	–10 dBV (0.3 V)
PHONES (1/4" stereo phone jack x1)	
Nominal Load Impedance:	8 ohms
Maximum Output Level:	100 mW + 100 mW approx. (at 8 ohms)
EQUALIZER	
HIGH (Shelving):	10 kHz, ±10 dB
LOW (Shelving):	100 Hz, ±10 dB
Frequency Response:	
MIC IN to L/R LINE OUT:	20 Hz to 30 kHz, ±3 dB
LINE IN to L/R LINE OUT:	20 Hz to 30 kHz, ±3 dB
LINE IN to EFFECT SEND:	20 Hz to 30 kHz, ±3 dB
LINE IN to PHONES:	50 Hz to 20 kHz, ±3 dB

Block Diagram

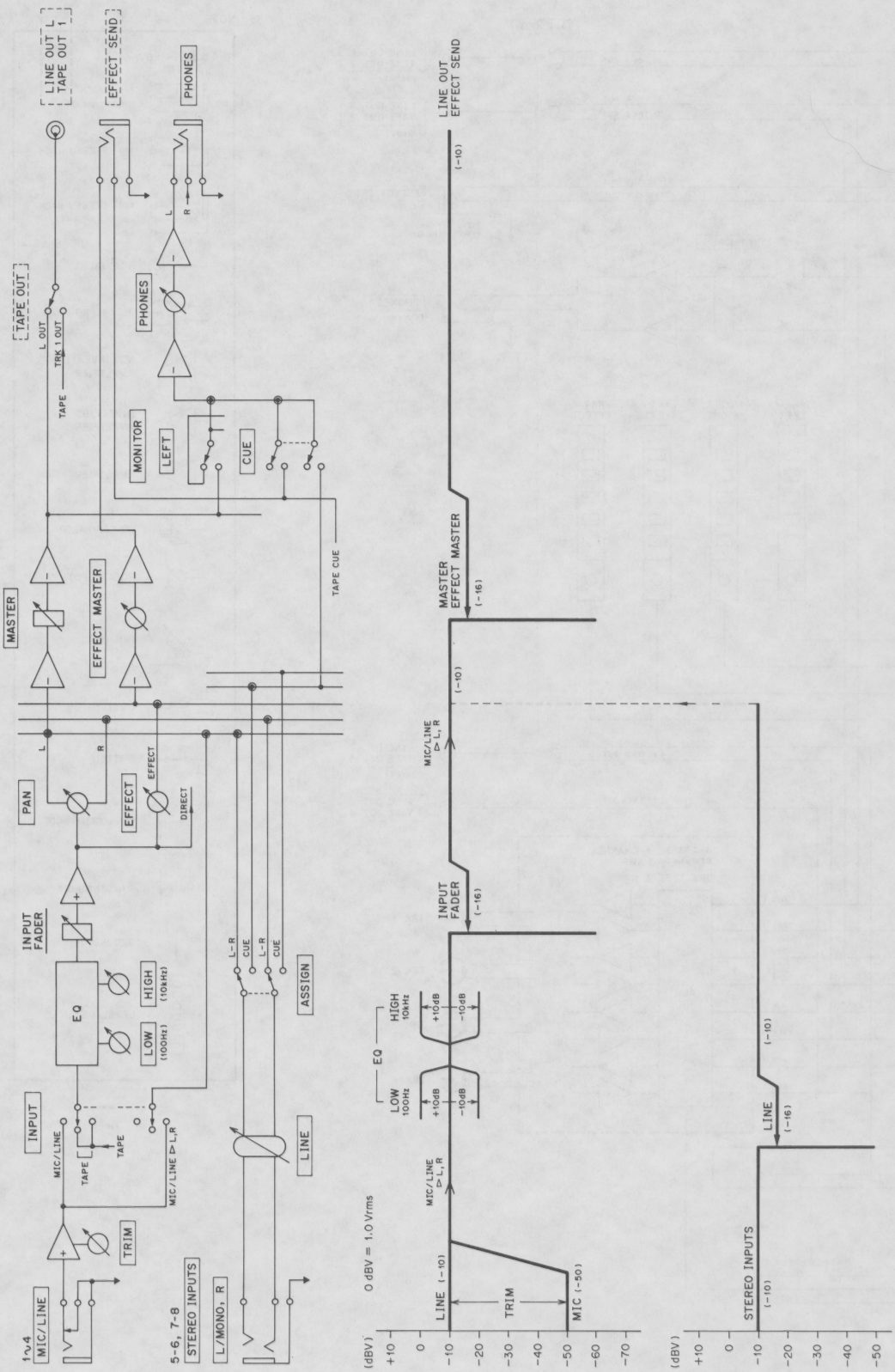



TAPE OUT
L OUT
TRK 1 OUT
LINE OUT L
TAPE OUT 1
(-10dBV)
R OUT
TRK 2 OUT
LINE OUT R
TAPE OUT 2
(-10dBV)
EFFECT OUT
TAPE CUE OUT
EFFECT SEND
(-10dBV)
TIP EFFECT
RING TAPE CUE
MONITOR
PHONES
LEFT
RIGHT
L
R
PHONES
(100mW)
CUE
TRK1 / LEFT
TRK2 / RIGHT
TRK3 / TAPE CUE
TRK4 / EFFECT
dB
+6
+3
0
-5
-10
TRK 1
LEFT
TRK 2
RIGHT
TRK 3
TAPE CUE
TRK 4
EFFECT
TRK
BUSS
METER
SYNC IN
TRK3 OUT
SYNC IN
TAPE OUT 3
(-10dBV)
SYNC OUT/ TRK4 OUT
SYNC OUT
TAPE OUT 4
(-10dBV)
4-TRACK 4-CHANNEL
REC/REPRO AMP
DBX TYPE II NR
REC 1
TAPE 1
REC 2
TAPE 2
REC 3
TAPE 3
REC 4
TAPE 4
dbx
NR
TRK 1
TRK 2
TRK 3
TRK 4
DBX
DBX
CONTROL
CIRCUIT
SYNC (TRK1∿3 TRK4 DBX ON DBX OFF)
ON
OFF

NOTE

0 dBV = 1.0Vrms
1/4" JACK
(INSERT BREAK)
1/4" STEREO JACK
1/4" STEREO JACK
(INSERT BREAK)
RCA JACK
REC/REPRO HEAD
NON INVERTING AMPLIFIER
INVERTING AMPLIFIER
AMPLIFIER
LINEAR FADER
ROTARY POT
PAN POT
SWITCH
SWITCH
CONNECTING NODE
SUMMING NODE
GROUND
LEVEL METER

Level Diagram



Signal-to-Noise Ratio (at Nominal Input Level)

UNWTD(20 Hz to 20 kHz)

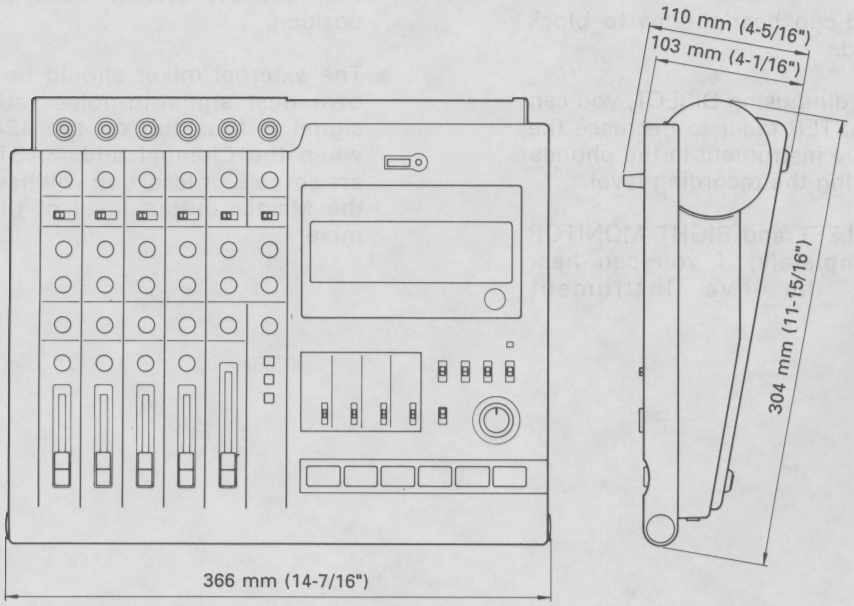
MIC IN to L/R LINE OUT·	66 dB at Trim Max.
LINE IN to L/R LINE OUT·	70 dB
Total Harmonic Distortion (THD)	
MIC IN to L/R LINE OUT·	0.06% (at 1 kHz, 10 dB above nominal input level, with 30 kHz low-pass filter inserted)
LINE IN to L/R LINE OUT:	0.04% (at 1 kHz, nominal input level with 30 kHz low-pass filter inserted)
Crosstalk:	55 dB (at 1 kHz, nominal input level with 30 kHz low-pass filter inserted)

Recorder Section

Record/Playback Channel:	4 in number (4 channel simultaneous)
Noise Reduction:	dbx* Type II (Off on ch.4 with the DBX switch at SYNC)
Frequency Response (overall):	40 Hz to 16 kHz, ±3 dB (at HIGH speed) 40 Hz to 12.5 kHz, ±3 dB (at NORM speed)
Signal-to-Noise Ratio (overall):	UNWTD(20 Hz to 20 kHz)/IHF A WTD
HIGH :	55 dB/58 dB (without dbx) 90 dB/95 dB (with dbx)
NORM:	54 dB/56 dB (without dbx) 88 dB/93 dB (with dbx)
Total Harmonic Distortion (THD):	1.0% or less (at 1 kHz, 0 dB)
Crosstalk (adjacent channels):	70 dB (at 1 kHz, 0 dB, with dbx) 50 dB (at 1 kHz, 0dB, without dbx)
Erasure:	70 dB or less (at 1kHz, BPF inserted)
Power Requirement	12 V DC, 1100 mA, via the provided AC-DC adaptor PS-P424
Power Consumption:	18 W

In these specifications, 0 dBV is referenced to 1 Volt. Actual voltage levels are also given in parenthesis (0.316 V for –10 dBV rounded off to 0.3 V).

* dbx is a registered trademark of dbx Incorporated.



TASCAM

TEAC Professional Division

424

PORTASTUDIO

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